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Ideology and the State: an Analysis of the Connection between Fairness, Altruism, and Redistribution

Noemi Mantovan

The aim of this thesis is to overcome the simplistic idea of *homo economicus*, by exploring the voting behaviour of heterogeneous agents whose actions are also influenced by their view of social justice and altruism. The thesis consists of four essays which explore the role of non-economic variables in defining individuals preferences.

The first essay develops the path-breaking approach initiated by Alesina and Angeletos (2005). It takes in consideration citizens' demand for fairness, and analyses their political choices in a multidimensional scenario. We show how including fairness explains various observed correlations between inequality, redistribution and growth.

The second essay analyses the connection between ideology and public schooling. It presents a model in which individuals care about their personal wealth, as well as about the public expenditure, which is allocated by the government between education and the public good.

The third essay deepens the analysis of the connection between the ideas of fairness and redistribution and how these evolve over time, and considers a society in which two instruments are available: an income tax and a wealth tax. To avoid double taxation of income, a tax differential is computed, which means that the income tax is subtracted from the wealth tax.

The fourth essay analyses the current British Government's "Big Society" plan, which is based on the idea that granting more freedom to local communities and volunteers will compensate for a withdrawal of public agencies and spending.

The main conclusion that can be drawn from this thesis is that ideology and altruism deeply influence individuals' preferences and behaviour and can affect political elections and economic fundamentals.

IDEOLOGY AND THE STATE: AN ANALYSIS OF THE
CONNECTION BETWEEN FAIRNESS, ALTRUISM, AND
REDISTRIBUTION

Noemi Mantovan

Thesis submitted in partial fulfilment of the requirements for the
degree of Doctor of Philosophy

Durham University
Durham Business School

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*To my parents,
for their unconditional love and support*

CHAPTER 1

INTRODUCTION

Empirical evidence¹ suggests that individuals do not base their voting decisions only on the advantage they can get from redistribution, but that altruism and ideology might strongly influence their decisions. However, this relation has not been fully explored theoretically, nor numerically. This thesis aims providing a solid analysis of the connections, interactions, and transmission mechanism between ideology, altruism and redistribution.

Two main relations need to be analyzed: on the one hand, how ideology influences preferences and redistribution, through the determination of preferences, and on the other hand how redistribution influences ideology itself, as well as altruism. In models à la Meltzer and Richard (1980), in fact, individuals vote according to their position in the wealth ladder compared to the mean voter. However, this has been proven to be a partial approach, showing the need for a more comprehensive analysis of preferences, which has to be able to take into account also ideology (Alesina and Glaeser, 2004). Moreover, ideology itself cannot be considered as a static parameter (Alesina and Angeletos 2005a). These two concepts are fully internalized in this work, which focuses on ideology and considers it as an evolving force, which builds both on past experiences and present signals. In this way, individuals are partially influenced by the ideology they inherit from their parents, and are partially influenced by the series of signals they receive from the outside world.

¹See for example Fong (2001), Alesina and Glaeser (2004), Alesina and Angeletos (2005a,b).

The introduction of concerns for fairness reconciles several empirical observations which would be inconsistent with models based upon individual income (and position in the income ladder) as the only determinant of the voters' views about taxes and transfers. Moreover, we explore the topical issue of the effects of redistribution on altruism and volunteering, which is in the centre of a timely and strong debate regarding the Big Society program in UK, for which we provide empirical, theoretical, and narrative analysis results.

This work relies strongly on the path breaking work by Alesina and Angeletos (2005a), which provides, for the first time to our knowledge, a model in which ideas of social justice, and more in particular fairness, enters the preferences for redistribution and shape voting behavior. A remarkable and yet unexplored feature of Alesina and Angeletos (2005) economy is that, given an initial vector of actual and "fair" wealth distributions, the model not only entails the whole sequence of wealth distributions, economic growth, and political winners, but also determines the evolution of cultural variables such as ideas of fair wealth distribution shared by each family. Hence, it implicitly contains a very special dynamical system that incorporates the whole socio-cultural-political dynamics of the economy.

Alesina and Angeletos (2005a) study the restrictions that the steady state conditions imply on the winning redistributive policies of their model. However, we deem it important to fully observe the whole dynamics of the system, with special reference to the actual and fair wealth distributions. This is important in order to test the robustness of their main predictions and, more importantly, to learn additional useful lessons for interpreting the actual historical time series of country development over a long span of generations. Given the complex structure of the model, it is hard to fully characterize the dynamic transition of this model analytically. In this thesis we develop and use general algorithms that allow simulating numerically the dynamic versions of ideology models: starting from any distribution of actual

and fair wealth of the initial generation we can reiterate the model for several generations. This enables us to compute the whole dynamic transition, with the sequence of redistributive policies that win the electoral game and the associated actual and fair wealth distribution of every generation. Moreover, throughout the thesis we introduce a probabilistic voting framework which allows for multidimensional, and which does not need to rely on the single-peakedness of preferences.

The main aim of this thesis is therefore to analyze the link between ideology, altruism, and redistribution. This is here studied from several perspectives, expanding the investigation on new frontiers and introducing unexplored paths. First, we focus on a general model that allows us to fully determine the evolution of ideology, fairness, and redistribution. Second, we differentiate between forms of redistribution, introducing indirect redistribution such as public schooling and public goods, and investigate their interactions with ideology and inequality. Third, we differentiate between various forms of taxation, providing analyses for the introduction of wealth tax, and income tax. Finally, we move the focus from ideology to altruism, and study what are the effects of the welfare state on volunteering.

In chapter 3 we provide a politico economic model that can trace over time the evolution of policies (income taxes and bequest taxes and transfer schemes), the evolution of inequality, and of the political preferences for redistribution, as a function of the changes in what individuals perceive as fair and unfair wealth differences.

We specifically focus on the evolution of ideology and how this happens together with the evolution of inequality and redistribution. We create an algorithm which enables us to repeat voting decisions and outcomes for several generations and to make several experiments for a variety of scenarios. We compare the intergenerational equilibrium time series deriving from different initial conditions, showing, for example, how low levels of initial wealth can lead to a long spell of considerably per-

sistent intergenerational economic poverty trap, causing high taxation, inequality, and low capital accumulation for a potentially very long period.

On the other side, higher initial wealth leads to lower taxation and higher equality and capital accumulation. In a very poor country the role of luck will be higher compared to a wealthy country; therefore individuals will vote for a higher redistribution, trying to reduce the role of luck. However, high redistribution can impair effort and reduce per capita wealth. In this case a second generation would also observe that differences in wealth depend on luck and decide to vote for higher redistribution, and so on, reaching a steady state with low capital accumulation, low wealth and high taxes. Different initial ideas of social justice have a strong influence on redistribution, so strong, in fact, that can bring about multiple steady states. We analyze how the ideology learned from the parent can clash with the world signals, explaining for example, how a very egalitarian "hippy" generation could be followed by a conservative Reagan or Thatcher era.

We also explore the role of culture. If it is true that ideology evolves over time, culture is a country specific imprinting that influences voting decisions. To study the effects of different culture, we distinguish between countries in which individuals care about fairness, countries in which individuals only care about their position in the wealth ladder, and countries in which individuals dislike inequality *per se*, regardless the source of it. The main results are that preferences for social justice matter, and that countries which are against any form of inequality might end up with very low per capita income and very high redistribution.

Moreover, we analyze the role of shocks, showing how, according to the perception of individuals about the fairness of the new wealth distribution, the political outcomes can be completely different, and even bring about multiple steady states.

In this thesis we also explore different forms of taxation and redistribution. In chapter 3 a distortionary bequest tax is introduced, with counter intuitive results:

if people believe that inherited wealth should be heavily taxed, without considering the source of it, they should prefer to equalize everyone's wealth at birth, bringing about a very high level of distortionary bequest taxes. In this case parents, who care about the net bequest and internalize the tax that will redistribute wealth within their generation, would vote for a high tax rate. This of course could have implications on all the aggregate economy. However, our experiments reveal that the presence of a bequest tax does not change at all the decisions of the individuals about the fiscal pressure, and that the bequest tax tends to be small.

We also, however, explore the role of different forms of redistribution in chapter 4, namely transfers, public goods, and public education, with the results that the interaction between ideology and public education can strongly influence policy outcomes. In fact, ideas of fairness interact with preferences for the amount of public schooling and with inequality. Moreover, this interaction does not have a limited effect on present time, but influences future abilities, future degrees of inequality, future levels of economic growth, and, more interestingly, helps shaping ideology.

An investigation about the interaction between ideology and public schooling is new to our knowledge, as the effects of ideas of fairness on different forms of redistribution have never been studied before.

We show that there is empirical suggestion that higher proportional expenditure for education is often associated with strong beliefs about fairness, namely that poor individuals have been unlucky and deserve to be helped. We replicate this result numerically. In the analytical model individuals care about fairness, and ideas about public goods and public education do reflect this role of ideology.

The main focus of chapter 4 is on how ideology affects public schooling and, by using a feedback mechanism, how public schooling influences ideology. First, we study how different initial ideas and definitions of fairness affect voting and therefore decisions about public schooling. We show experiments in which different cultures

are compared, finding, among other results, that societies which are strongly against inequality *per se* might impose such a heavy taxation that the positive effect given by an increase in abilities because of more public schooling would be more than offset by the taxation's discouraging effect on effort. On the other hand, stronger initial ideas of fairness, bringing higher taxation for one generation only, might strongly boost public schooling, and the effect of the increase in the abilities could be so strong that would lead, for several generations, to have individuals with high abilities, who produce high effort, who have high per capita income, and a society showing a low Gini coefficient.

At the same time, also the effects of public schooling on ideology are studied, with the result that higher public schooling in a generation will increase fairness in the society, reduce redistribution, and encourage effort for a very long period. Finally, we show how the relationship between education and ideology is robust to the introduction of transfers and distortionary bequest tax.

In chapters 3 and 4 we prove that a distortionary bequest tax does not change the relation between redistribution (including indirect forms of redistribution), inequality and ideology. However, the policy outcomes can radically change if a non-distortionary inheritance tax is implemented, and its effect combines with the effects of introducing ideology. In chapter 5 we explore this possibility. We assume that individuals can vote, at the beginning of their life, to impose a tax on the (gross) bequest they received from their parents, to be redistributed lump sum between individuals belonging to the new generation. To avoid double taxation of income we compute a tax differential: we subtract, for each individual, the income tax from the wealth tax. In this way, the government can distinguish between wealth derived from work and wealth derived from bequest, and can impose an income tax and a tax on the capital stock.

The main strong result is that, if fairness matters to individuals, it is preferable to have a higher wealth tax and a smaller income tax. We derive several analytical results, about the steady state level of wealth tax and income tax, in different scenarios in which luck or abilities become predominant in determining differences in wealth. We also determine the wealth maximizing tax composition: we investigate which amount of income and wealth tax can bring about the higher per capita wealth. Moreover, we provide several numerical results, including simulations of the differences between this formulation and the one presented in Chapter 5, the reactions to different origins of wealth, and a comparison between an income tax and a wealth tax.

Finally, we slightly move the focus from ideology towards the relation between altruism and redistribution, by presenting, in chapter 6, an interdisciplinary work that offers a study of the Big Society. In fact, recently, the British coalition government started a plan to build a ‘Big Society’ in which public activities and spending are “rolled back” and citizens themselves take more responsibility in running public services. This hypothesis is based on the belief that high government expenditure will affect negatively volunteering because of a crowding out effect, implying that an increase (decrease) in public expenditure brings about a decrease (increase) in individuals’ propensity to volunteer. However, there is very little theoretical and empirical evidence to support this assumption.

For the first time to our knowledge, we study the connection between volunteering and government expenditure using three different instruments: an analytical model, an empirical investigation, and a narrative analysis based on grounded theory. In the model we build, we assume that individuals care about the effects of volunteering because of their altruism, as well as having a high level of wealth and receiving public goods. As standard, we also assume they have increasing marginal disutility of effort, be it exerted in the market or in the volunteering activities. The main

result of the model, contrary to the idea at the base of the Big Society, is that, for individuals who work, an increase in government expenditure increases the time spent volunteering. The same result emerges from econometric analysis developed on the British Household Panel Survey data, and on the European Values Survey data, as well as from the narrative analysis, conducted with interviews in the Glasgow area.

Even though several aspects are analyzed, this thesis does indeed provide one main conclusion: the complex interactions between ideology, altruism and redistribution cannot be ignored.

The thesis proceeds as follows: in chapter 2 we present a review of the literature. In chapter 3 we provide an analysis of the evolution of ideology, fairness and redistribution. In chapter 4 we provide a model of the relationships between public schooling, ideology and fairness. In chapter 5 we introduce a study on the tax differential, wealth tax and the influence of ideology. In chapter 6 we present an investigation of the Big Society, and of the connection between redistribution and volunteering capital. Finally, in chapter 7 we draw and present the conclusion.

CHAPTER 2

LITERATURE REVIEW

This thesis explores several topics in political economy, and more in general in macroeconomics, such as the interactions between inequality and redistribution, ideology, voting systems, capital taxation, education, altruism, and volunteering. Even if the focus is specifically on the relation between ideology, altruism, and redistribution, we interact with other streams of literature. This chapter presents a brief review of the literature streams which are mainly connected to this work.

A short section will introduce the pioneristic literature that studies the relation between inequality and redistribution, this is necessary to give an introduction of what are the results if no ideology is considered. After, we differentiate between forms of taxation and forms of redistribution: first, we will differentiate between forms of taxation and present a short review of the literature about the optimal capital tax and its effects. Second, we will analyze different forms of redistribution and review the literature about the effects and forms of public education. Moreover, we start exploring altruism, and what can be the effect of redistribution on decisions to volunteer according to the recent literature. Finally, we will dive more in core of the literature that most influenced this thesis: the one that focuses on the determination of preferences for redistribution. After a more general introduction, we will review the work by Alesina and Angeletos (2005a) which especially relates to this thesis, comparing its welfare functional to inequality measures, and offering a short comparative analysis of different voting mechanisms.

2.1 THE RELATIONSHIP BETWEEN INEQUALITY AND REDISTRIBUTION

Since the 1980s several authors started investigating how inequality influences redistribution, and how this connection affects economic growth. The idea is that individuals observe their position on the wealth ladder and decide to redistribute accordingly. Therefore, the higher the wealth or income inequality, the higher the redistribution. The pioneering work by Meltzer and Richard (1981) focuses on the relation between the position of the pivotal voter in a majority rule and the size of redistribution. Their main finding is that the poorer is the pivotal voter the higher is going to be the redistribution and the lower the economic growth.

The effects of the redistribution on the wealth, on the other side, change according to the specifications of the models: Alesina and Rodrick (1994), and Persson and Tabellini (1994) find a monotonic determination of the link between growth and redistribution. In both works authors proved that inequality brings about higher redistribution, which, in turns, drives down economic growth.

On the other hand, Bertola (1993) builds an endogenous growth model, where the median voter's choices can help or damage economic growth, depending on economic policies menu. Perotti's empirical conclusions (1996) are that the relationship between inequality and redistribution is non-significant.

Other studies found out that the redistribution can boost wealth. Bénabou (1996) and Galor and Zeira (1993) focus on the positive relation between redistribution and economic growth. In fact, due to credit market imperfections, the economy cannot develop to its full potential, which is reached only through the distortions created by taxation and redistribution.

Similar conclusions arise from the work by Aghion et al. (1999), who examine credit market imperfections, as in Bénabou (1996), and introduce markets volatility and the possibility for moral hazard, which can be corrected through taxation. If

this is the case, in fact, redistribution can be used to correct market failures and therefore lead to a virtuous circle where both equality and growth increase.

The main conclusion that can be drawn by this stream of literature is that individuals decide to vote according to the benefit that they can get from redistribution, and that taxation can have a strong influence on the economic growth.

However different tax systems can have different effect of the economic growth. In Chapter 5, we will introduce a differential tax system in which the income tax is detracted from the wealth tax, and we will analyze the implications that will arise for the preferences for redistribution and economic growth. In the next section we will analyze the effects of the introduction of a tax on capital.

2.2 OPTIMAL CAPITAL TAXATION

The search for the optimal wealth taxation is still a timely and unresolved problem, but it should not be forget that in has been one of the macroeconomics angular stones. In particular, the problem of double counting when income is taxed has already been deeply analyzed from the nineteen century. Mills (1884) proposes to exempt savings from the income tax. The problem of double counting is also studied by Fisher (1939), who analyses the effects of an Accretion Tax, which is a broader tax that can include savings, capital value and income capacity. Kaldor (1955) arrives at the conclusion that, in order to avoid double counting, a consumption tax is preferable to an income tax.

In more recent times, the debate about the opportunity of wealth and capital tax has flourished. The typical result from the Ramsey literature, where lump sum taxes are not available, is that in dynamic models with homogeneous individuals the optimal capital taxation is zero (Atkinson and Stiglitz, 1976 and 1980 and Feldstein

1978)¹. The main reason is that a tax on capital income is seen as a differential in the commodity taxation. In fact, Atkinson and Stiglitz uniform commodity taxation theorem (1976) states that if utility is weakly separable between consumption and leisure, then it is optimal to tax all the goods at the same rate. Atkinson and Stiglitz (1976) proved that a positive tax on capital income means imposing a higher tax on the future consumption compared to the current one, and thus violates the uniform commodity taxation theorem.

The result of zero capital taxation holds for overlapping generation models with heterogeneous individuals (Diamond, 1973), and for infinitely lived individuals (Chamley, 1986). The zero capital taxation is also found in finite time, depending on the classes of preferences (Basu et al. 2004). Moreover, the zero capital result is also obtained by Lucas (1990) in the presence of human capital, and by Jones et al. (1997), who build an innovative human capital accumulation process by differentiating between consumption goods that increase the productivity and consumption goods that increase the abilities.

On the other hand, if the focus of the taxations is redistributive and the individuals are heterogeneous it is possible to obtain, using politico-economic equilibria, a positive capital tax (see Krussel et al., 1996). In a Ramsey framework, considering a life-cycle economy in which individuals have to allocate their time between work and leisure, Erosa and Gervais (2002) find it optimal to violate the uniform commodity taxation theorem, and therefore implement a positive capital taxation that varies with the age of individuals. This result derives from the fact that even in a steady state the allocation between consumption and savings varies in individuals' lives.

The optimal capital tax has also been studied in a business cycle model by Chari et al. (1994), who obtain that the optimal policy is represented by zero capital taxation and constant labour taxes. Chari et al. (1994), in fact, reject the idea of a

¹See Renstrom (1999) for a detailed literature review on zero capital taxation.

tax smoothing model and find it optimal to have high capital taxation on the period of transition of the cycle only.

Moreover, fiscal policy reforms and the possibility for alternative taxes were analyzed by Bradford (1986), who defines the X Tax, which is a value added tax the rate of which is linked to the income. Altig et al. (2001) make a comparative study between five alternative fiscal systems in the U.S. and prove how the X Tax can replicate the income tax, at least in the U.S..

The debate regarding the optimal capital tax has recently found new strength thanks to the insights of the New Dynamic Public Finance², that originates from the Mirrlees (1971) framework, but extends it in a dynamic environment, and in contrast to the original Ramsey result, finds it optimal to impose a positive capital taxation, at least for some individuals³. Kocherlakota (2005) builds a model in which abilities are private information and subject to aggregate shocks, and individuals are heterogeneous. In this case, the average wealth tax is zero, because the optimal tax is positive for people who will have low skills in the next period and negative for people who will have high skills in the next period, in order to augment the next period effort.

In the work by Farhi and Werning (2008), the positive capital taxation arises from decreasing marginal utility of wealth and stands only if there is not perfect commitment. With perfect commitment, the average capital taxation would be zero. Also in Farhi and Werning (2010) and in Golosov et al. (2011) redistribution derives from the decreasing marginal utility only. In the work by Golosov and Tsyvinski (2007) the positive taxation arises from the incomplete information about consumption and trading. The authors show that if trade is not observable, the equilibria deriving only from the market are not efficient. If the consumption is

²See Golosov et al. (2006) for a literature review.

³In Mirrlees environment the tax rates are often nonlinear.

perfectly observable, than neither taxes nor insurance can improve the allocation of resources. When a positive capital tax is implemented, it reduces the return on the retrading market, and increase the probability of the individual revealing the truth about her skills.

Not only the type of tax is important, but also the type of redistribution. Lump sum redistribution can have different impact compared to a specific form of redistribution. In particular, in Chapter 4 we will introduce the possibility to use tax revenue to finance public education. In the next subsection we offer a short review of the literature about public education and inequality.

2.3 INEQUALITY, PUBLIC EDUCATION, AND ECONOMIC GROWTH

The role of public education in determining the inequality level and economic growth of a country has been analysed from various perspectives. Without pretending to comprehensively cover this burgeoning literature, here we distinguish between five important perspectives.

First of all, the general level of public education and the presence of education subsidies have a positive influence on economic growth (Bénabou 1996, Perotti 1996). If there is only private education, the impossibility of parents to borrow for the education of their children is detrimental for economic growth. The wealth can tend to an ergodic distribution on the long run (Loury, 1981), or, if the technology is non-convex and there are credit market imperfections (Galor and Zeira, 1993), it is possible to have multiple steady states according to the initial wealth distribution. The multiplicity of steady states with an imperfect credit market can depend on low wages (Banerjee and Newman, 1994) and on high interest rate (Piketty, 1997)⁴.

⁴For the condition under which an ergodic distribution is reachable see Aghion and Bolton (1997).

Second, high initial inequality has a detrimental effect on public education and consequently on economic growth. According to an empirical study by Galor et al. (2009), which focuses on the beginning of the 20th century in US, the inequality in the distribution of land negatively affects the implementation of public schooling. The lack of public education in turns impedes the emerging of a skill-intensive industry and slows down the economic growth.

Third, the positive role of education has been studied by the literature on human capital⁵, which focuses on the decision of individuals about how much time allocate to education (human capital accumulation), and how much time to allocate to leisure or work. Individuals' productivity depends not only on their personal investment in human capital, but also on the average level of human capital. This last feature can depend on the change in the aggregate technology (Lucas, 1988) or on the fact that firms invest more if they assume the workers have higher skills (Acemoglu, 1996).

Fourth, the role of public schooling has been analysed also in relation to public economics, challenging the assumption that higher public schooling improves the wealth of poorer individuals. In particular the implications of public and private schooling regimes have been studied. If public education increases equality, private education brings about higher average income (Glomm and Ravikumar, 1992). Moreover, if education is only partially publicly provided, then there is the possibility that it will transfer resources from the low income individuals to high income individuals (Fernandez and Rogerson, 1995), especially if public expenditure for education is concentrated on secondary education. However, subsidies to education reduce the wage inequality and therefore the differences in individuals' level of education. This last indirect effect can more than offset the negative direct effect that subsidies have on education and increase social mobility while decreasing inequality (Hassler et al., 2007).

⁵See Lucas (1988) for an analysis about human capital.

Fifth, public education is also often seen as a way to reduce the level of social exclusion. A public expenditure on education which is not perfectly distributed between different economic classes is a form of social exclusion (Gradstein, 2003). It causes a feedback mechanism: unequal access to education causes bigger future differences and the possibility of multiple equilibria. This mechanism depends on the differences in the distribution of political power. In a representative democracy without lobbies, every family has the same influence on political results, leading to a "one person one vote" scheme in which the median voter is the pivotal one. Otherwise, if political power is positively related to income, arriving to the extreme "one dollar one vote" scheme, the fiscal policy will be determined by the preferences of richer citizens only (Bénabou, 1996). This could lead to multiple equilibria, which depend on initial income differences. If there are little differences between the income of individuals, people will adopt a social inclusive system. So, the system will converge to a relatively high mean income, with low inequality. On the contrary, if inequality is high, the poorer individuals could be excluded from the political decision and the economy could converge to a society with lower incomes and higher inequality.

Chapter 4 further investigates what influences the preferences for public schooling (and vice versa). This is necessary because the idea that the poorer the individual is, the higher her demand for public schooling will be, is not necessarily true. In an economy in which public and private schooling are available, with credit market imperfections, an increase in income might have two opposing effects on individuals' fiscal preferences: an increase in income causes a higher demand for education, but at the same time heavier taxation provokes a net loss (Gradstein, 2004). The older the individual is, the lower her support for public schooling is probably going to be. In the US, for example, public schooling expenditure has been found to decrease in areas in which the number of elderly population increases (Poterba, 1997).

Not only government expenditure can be used to finance public goods such as public education, but also altruistic individuals can produce goods through money or time donation. In next section we will introduce the literature about the determinants of volunteering.

2.4 VOLUNTEERING, THE STATE, AND THE BIG SOCIETY PROGRAM

In the recent literature there have been several important developments for analysing the connection between government expenditure and voluntary work at a macroeconomic level. Over the past years several empirical works have studied the determinants of voluntary work for the total population or for specific groups of people. For example, at a general level people can decide to start volunteering, or give money to charity, because of pure altruism or warm-glow altruism (Andreoni 1990), because they want personally to ‘make a difference’ (Duncan, 2004), because they are the most impatient to receive a certain good (Bilodeau and Slivinski 1996), because giving can enhance their wellbeing (Meier and Stutzer, 2008), because of social pressure (Della Vigna et al. 2011), or because they are obliged by social norms (Olken and Singhal 2009). The decision to participate in voluntary activities is also likely to be influenced by the socioeconomic or ethnic composition of the individuals’ neighborhood or community (Alesina and La Ferrara, 2000; Atkinson & Kintrea, 2001; Goodlad and Meegan, 2005).

Although the Big Society in particular aims at enhancing volunteering in (deprived) neighbourhoods or communities, several authors have suggested that the decision of citizens to volunteer might depend more strongly on macro-economical factors rather than the characteristics of the area of residence (Hastings, 2003; Amin, 2005; Atkinson, Buck, & Kintrea, 2005; New Economics Foundation, 2010). An important stream of research has explored how a change in the size of the

welfare state influences the decision to volunteer (e.g. Khanna & Sandler, 2000; Van Oorschot & Arts, 2005; Hackl et al., 2010). These studies have focused on the entire population or on the specific age groups of young people and retired people. However, perhaps the most crucial type of citizen, both for the Big Society as for the relationship between government expenditure and volunteering in general, is part of the population that has to allocate time between working in the market, volunteering and leisure. In chapter 6, we explore the impact of public spending on volunteering, but, for the first time to our knowledge, only concentrate on the employed part of the population.

At an aggregate population level, recent studies have investigated the possibility of crowding in or crowding out effects due to an increase of the welfare state. In particular Khanna and Sandler (2000) find an opposite effect (crowding in) in a study regarding money donations in the UK. Van Oorschot and Arts (2005) do not find evidence to support the hypothesis of crowding out when considering data from the third wave of the World Values Survey, and using the total government expenditure as measure of the welfare state. On the other side, Hackl et al. (2010), when concentrating on the independent variable of social government spending in their analysis of data of OECD countries, taken from the European Values Survey and the World Values Survey, do find a crowding out effect on the four world waves (1981, 1990, 1995, 1999).

Age tends to be a very strong determinant of the decision to volunteer. First of all, firm evidence exists that individuals tend to start volunteering later in life, mainly after their retirement (Mutchler et al., 2003). In fact, retired people are often so overrepresented in voluntary activities that old age is one of the key characteristics of ‘the usual suspects’ (e.g. Barnes et al., 2007). To be sure, the reasons for volunteering at an old age are likely to be varied and depend strongly on the health condition of the individual (Erlighagen and Hank, 2006). At the same time, in the past years the

voluntary work of young citizens has been studied in research about the interactions between volunteering and human capital. For example, the study by Day and Devlin (1998) finds a positive relation between the returning rates of income after having done voluntary work in Canada. Young citizens, about to enter the job market, can see volunteering as an optimal decision for enhancing their human capital and thereby having prospects of a higher income.

Altruism does not only drive volunteering, but can also affect preferences for redistribution. Throughout this work will not consider individuals who vote only accordingly to what is their position on the wealth ladder, but we will consider individuals who care about living in just world. In the next section we describe the literature which analyses different determinants for the preferences for redistribution.

2.5 PREFERENCES FOR REDISTRIBUTION

In the past years, scholars started investigating how preferences for redistribution are not always directly related to how much an individual gains or loses from a fiscal policy. First of all, preferences for redistribution can depend on the history of an individual, namely on the past income (Piketty, 1995). Each individual does not vote only according to the advantage she can actually get from redistribution given her current condition, but she learns from her past social mobility and relies on that when voting for fiscal policy. The key point in Piketty's model (1995) is that in the long run this mechanism will bring about the development of different dynasties, which differences in the preferred level of redistribution and therefore in the supplied effort.

On the other hand, scholars also analysed the impact of future expectations of social mobility on actual preferences. The POUM hypothesis (Prospect of Upward Mobility) developed by Bénabou and Ok (2001) is key in this sense. The authors

focus on individuals who know the stochastic process that drives income in the society and vote accordingly. Depending on the shape of the function connecting actual and future income and considering the fact that fiscal policies are, to some degrees, persistent for future periods, even individuals poorer than the mean might prefer a low tax rate. The reason is that each individual knows that she will lose from an aggressive fiscal policy if she expects to be richer than the mean voter in the future⁶.

Another factor that can influence the preference about redistribution is the fear that strong inequality can lead to a high crime rate. The interactions between inequality and crime has been empirically studied, proving the existence of a strong correlation between the two factors (see Fajnzylber et al. 2002). Moreover, strong inequality in a society can be detrimental for property rights in two ways: (1) poorer citizens can choose to implement redistribution using violence or revolutions, and (2) the richer part of society can influence or change the political or legal decision through the use of political contributions or bribes (Glaeser et al. 2003). It should be noted, however, that while the idea that inequality enhances criminality is unanimously accepted, the idea that redistribution can diminish the crime rate through a reduction of inequality is not. According to Imrohoroglu et al. (2000), redistribution could even enhance criminality because subsidies and taxes may distort individuals decisions between working and committing crimes.

Moreover, redistribution preferences can be influenced by the expected impact of taxation on social competition. According to this theory, citizens belonging to the middle and the upper classes want to maintain the social gap respectively toward the lower and the middle classes. Corneo and Gruner (2000) prove that the redistribution preferred by the median voter turns out to be a decreasing function of the social

⁶Bénabou and Ok (2001) consider also agents who care about the future income of their children.

gap between the middle and the upper class, and an increasing function of the social gap between the lower and the middle class. The median voter, who belongs to the middle class in the Corneo and Gruner's model (2000), wants to maintain the social distance compared to the lower class individuals, and will vote accordingly, even if this means choosing a relatively lower tax rate compared to the one they would have chosen in a world where social life does not matter.

Some authors have recently started studying how personal characteristic can influence the preference for redistribution, in particular referring to gender and ethnicity. According to the result of the experiment by Andreoni and Vesterlund (2001), women and men differ in the demand for altruism and their equality preferences. Alesina and Giuliano (2009), moreover find that women tend to be more favorable to redistribution than men.

Also ethnicity seems to be an important factor: one of the results of the empirical work by Alesina and La Ferrara (2005) is that white US citizens tend to be more adverse to redistribution than Afro-American citizens. Luttmer (2001) proves that interpersonal preferences about redistribution tend to be characterized by two properties: (1) individuals diminish their support for redistribution as the reciprocity rate in their community increases; and (2) people tend to show a strong racial group loyalty.

A recent and innovative idea is that personal opinion and beliefs about fairness and social justice can influence redistributive preferences. Authors stopped considering only selfish individuals and started analysing individuals who want to live in a fair world, and vote accordingly. Fong (2001) analyses the relation between the belief of self or exogenous income determination and redistribution. The author investigates the role of beliefs about effort, luck and opportunities in life, and redistribution, and finds that, in some cases, these beliefs can be of more influence than

the personal position in the income ladder. Moreover, the author enquires into the origins of those beliefs.

Bénabou and Tirole (2006) build a model where beliefs are shaped not only by economical factors, but also by individuals' targets and psychological needs.

In Alesina and Glaeser (2004), on the other side, ideas about redistribution can be the result of manipulation by political parties. If Bénabou and Tirole (2006) explain the redistributive differences between Europe and United States in term of people's intrinsic optimism, Alesina and Glaeser (2004) explain the differences by referring to the idea that beliefs about social justice in the US have been determined by indoctrination controlled by right-wing parties and wealthier people. On the other side, in Europe beliefs have been shaped by a predominant left-wing ideology. Alesina and Glaeser (2004) study empirically the causes of redistribution, focusing on the differences between the fiscal systems adopted in Europe and the United States. Their result is that geographical and historical factors shaped the institutional structure of countries. At the same time, the institutional structure determined the predominance of a type of political party (right wing in the United States and left wing in Europe). The mainstream political view in a country influences individual opinions about why people are poor and therefore about redistribution. If poor people are unlucky then they deserve to be helped, if otherwise they are lazy, there is no reason to help them. Alesina and Glaeser (2004) analyze the correlation between the beliefs of citizens of different countries and redistribution, finding a strong 61%. A different perception of poverty can bring about differences in the tolerance for inequality.

Alesina and Glaeser (2004) prove, *in primis*, that the idea that the United States has bigger social mobility than Europe is not supported by any empirical evidence. The data about incomes mobility and inequality show that, economically speaking, the hypothesis that the United States are a sort of "land of opportunities" is not true relatively to Europe. American poorer individuals seem to have more probability

to remain poor compared to European poor individuals. The study by Alesina and Glaeser (2004) shows that about 60% of Americans who belong to the fifth income quintile did not show any variation in income in 9 years. In Germany this happened only to the 46,3% of people who belong to the last quintile.

In both the US and Europe beliefs about economic mobility are not consistent with the actual data. Alesina and Glaeser (2004) examine the World Values Survey data about the United States and Europe. In the United States, 29% of the people who participated in the survey think that poor people are condemned to remain impecunious. Sixty percent of the participants believe that poor people are lazy. In Europe, 54% of the population believes that poor people are just unlucky and only the 26% thinks that they are lazy. The majority of the Europeans believe that the wealth of the family of origin determines individual future income. Moreover, they tend to believe that poor people cannot come out of poverty. The majority of the US citizens, on the contrary, believe that poor people are just lazy and do not take advantage of living in "the land of opportunity".

At the same time the average income in US is higher than in Europe. Having ancestors who moved from Europe to the US to look for better condition might influence the way of thinking of US citizens. According to Alesina and Gleaser (2004) empirical results, individuals living in US are less keen in believing that there are social classes, and more keen to believe that poor people deserve to be poor. Not just political party have a role in shaping people preferences, but also education. Public education in US always had a very clear direction, and ideas introduced at school were the ideas of richer citizens, who would finance, through donations, public schooling. Even nowadays, and even consider the pluralistic forces in universities, public schools are managed by local authorities, who are usually strongly against the possibility of left wing ideas being taught during classes. Such an education

federalism is absent in Europe, where teachers can more freely decide what exactly to teach.

Alesina and Glaeser (2004) also analyze the effects of opinion about the causes of poverty on redistribution systems. They found that the more proportional is the system, the higher is redistribution, and the strongest is the belief that poor people have just been unlucky. However, the redistribution itself cannot be considered endogenous.

Another determinate for different beliefs and redistribution preferences seems to be the area of a state. A very big country might create a geographic barrier to workers movements. Alesina and Glaeser (2004), in fact find that, considering countries whose per capita GDP is higher than \$15000, the correlation between area of the country and laziness of poor people is 66%. Finally, Alesina and Glaeser (2004) focus on ethnic fragmentation, find out how more ethnically fragmented countries tend to have lower redistribution.

Luttmer and Singhal (2011) empirically analyse the fiscal preference of immigrants across thirty-two countries of origin, proving that the average preference for redistribution of the country of origin has a large and significant effect on the preference for redistribution even after years the individuals have moved. Moreover, the effect is persistent to the second generation. So, the cultural imprinting regarding social justice is at least as important as the actual context in shaping preferences.

In the next subsection we will analyze the dynamic model by Alesina and Angeletos (2005), which relates the most this thesis. The model will be deeply studied deeply, and a comparative study to other possible ways of modelling will be offered.

2.6 FAIRNESS AND REDISTRIBUTION: ANALYSIS OF ALESINA AND ANGELETOS

(2005A)

This thesis is strongly related to the work by Alesina and Angeletos (2005a). They study how the beliefs of citizens about the origins of inequality, combined with a demand for fairness, determine the fiscal policy of a society. In Alesina and Angeletos (2005b), individuals consider inequality originating by corruption and rent seeking more unfair than inequality originating from differences in effort. The more unfair citizens consider society, the more they are willing to redistribute. This will lead to bigger governments, which in turn will raise the possibility for corruption, creating a vicious circle where inequality, taxes and corruption increase. Alesina and Angeletos' work (2005a) contains two models: a static and a dynamic model. In both cases, the authors analyse the equilibrium deriving from the decisions of individuals who care about the economy wide wealth distribution. In this way, the authors are able to incorporate social preferences about the aversion of inequality, when individuals believe that social iniquities ultimately depend on luck. The main result of the static model is the multiplicity of equilibria, whereas the dynamic version of the model predicts the possibility of multiple steady states.

Alesina and Angeletos (2005a) built a dynamic model with intergenerational linkages. Society is composed of a sequence of non overlapping generations, indexed as t . Each individual observes her own characteristics such as the innate abilities $A_i > 0$, willingness to work $\beta_i > 0$, luck η_i ⁷, and the capital inherited from her parent k_{it-1} . After voting for the wealth tax τ_{it} , which will imposed at the end of life, individuals produce effort e_{it} and, after the taxation is imposed and the revenues redistributed, individuals decide how to allocate the end of life wealth w_{it} between consumption c_{it} and bequest for the child k_{it} .

⁷Luck is i.i.d. distributed, with mean 0.

Gross wealth depends on abilities, effort, luck and capital inherited from the previous generation

$$y_{it} = A_i e_{it} + \eta_i + k_{it-1}$$

and the individual budget constraint

$$c_{it} + k_{it} = w_{it}(1 - \tau_{it})y_{it} + G_t$$

Private utility depends positively on consumption and capital, and negatively on the effort. The negative effect of the effort is mitigated by the willingness to work β_i :

$$u_{it} = V(c_{it}, k_{it}, e_{it}) = \frac{1}{(1 - \alpha)^{1 - \alpha} \alpha^\alpha} c_{it}^{1 - \alpha} k_{it}^\alpha - \frac{1}{2\beta_i} e_{it}^2,$$

where $\alpha \in (0, 1)$ represents the intergenerational generosity parameter. The optimal consumption, capital, and effort are given by

$$c_{it} = (1 - \alpha)w_{it}, \quad k_{it} = \alpha w_{it}, \text{ and } e_{it} = (1 - \tau_t)A_i\beta_i,$$

Alesina and Angeletos (2005a) use a quasi linear utility function. For the private utility function u_{it} they use a Cobb-Douglas component $\frac{1}{(1 - \alpha)^{1 - \alpha} \alpha^\alpha} c_{it}^{1 - \alpha} k_{it}^\alpha$ to which they subtract the square effort component mitigated by the willingness to work $\frac{1}{2\beta_i} e_{it}^2$. Alesina and Angeletos (2005a) use a warm glow form of altruism. If other forms of altruism were chosen, the private utility function would change. If author had chosen pure altruism, then the whole utility of the subsequent generation would be included in the utility function, and the problem could be solved through

dynamic programming, using an infinite sequence of controls u_{it} to maximize the whole sequence:

$$\sum_{t=0}^{\infty} \beta^t r(x_t, u_t)$$

subject to $x_{t+1} = g(x_t, u_t)$, where $\beta \in (0, 1)$ is a discount time factor and x_t the state variable, with x_0 given. In this case, given that certain conditions on the function $r(x_t, u_t)$ and the set (x_t, x_{t+1}) were satisfied⁸, it could be possible to build a value function, generate a Bellman Equation, and solve the problem recursively, without the need for a politico-economic equilibrium, with repeated voting in every generation and making a static model, indeed, dynamic.

However, the model of Alesina and Angeletos (2005a), could not be transformed easily into a dynamic model with pure altruism. The reason is the welfare functional: the measure of unfairness Ω_t , is subtracted from the private utility function. The measure of social justice is given by the distance between the actual utility and the fair utility for each individual:

$$\Omega_t = \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj$$

In fact, Alesina and Angeletos (2005a) define for each real variable in the economy also the fair shadow values, which depend only on effort and abilities of the individual and her whole family history:

$$\hat{c}_{it} = (1 - \alpha)\hat{z}_{it} \quad \hat{k}_{it} = \alpha\hat{z}_{it} \quad \hat{y}_{it} = \hat{w}_{it} = A_i e_{it} + \hat{k}_{it-1} = \sum_{s \leq t} \alpha^{s-t} A_s^i e_s^i$$

⁸For a detailed description see Persson and Tabellini (2000).

This formulation of Alesina and Angeletos (2005a) is innovative compared to others, as they do not focus on inequality indexes but on unfairness index. Several papers have analyzed measure of inequality, starting from different assumptions. Conventional measures of inequality are represented by: first, the simplest possible measure is the variance of the wealth:

$$\int (w_{jt} - \bar{w}_t)^2 dj.$$

In this simple case the higher the variance of wealth the higher the inequality. Second, the coefficient of variation, which divides the income distribution for its average. For example Dalton (1920) defines the inequality measure as:

$$\frac{\int U(y)f(y)dy}{U(\bar{y})}$$

where y represents the income, $U(y)$ the actual social welfare, and $U(\bar{y})$ the social welfare that would derive from an equal income distribution. This measure, although generally accepted, has been criticized by Atkinson (1970), as it does not allow for linear transformations.

Third, the relative mean deviation, as defined by Schutz (1951), which partially combines the distance from mean approach and the ration approach.

$$\frac{\int |y_{jt} - \bar{y}_t|}{\bar{y}_t} dj.$$

Fourth, a more refined measure of inequality: the Gini coefficient, here shown as in Sen's (1973) formulation:

$$G = \frac{n+1}{n} - \frac{2}{n^2 \bar{y}} \sum_{i=1}^n (n+1-i)y_i$$

Where n represents the number of individuals, and i the individual. The Gini coefficient represents the normalized area between the Lorenz curve and the 45° line. The Lorenz curve is the graphic representation of the Lorentz ranking against the portion of the population n ; where the Lorentz ranking consists in the normalization of the cumulative income functional by the mean⁹:

$$L(F, n) = \frac{C(F, n)}{\bar{F}}$$

Finally, the Atkinson Index (Atkinson, 1970), requires an also an indication of the strength of the inequality aversion ε :

$$I = 1 - \frac{2}{y} \left[\int y^{1-\varepsilon} dF(y) \right]^{\frac{1}{1-\varepsilon}}$$

According to Cowell (1998) there are two main points to be considered for inequality aversion: First, how should transfers from rich to middle class be ranked to transfers from middle class to poor? And, second, at what rate should society trade more equality for lower mean income?

Defining an inequality aversion parameter is comparable to Alesina and Angeletos (2005a) importance of unfairness γ , and it can be considered as a measure of culture, rather than ideology. In Alesina and Angeletos (2005a), in fact, ideology has the possibility of changing and creating multiple equilibria. In fact, in equilibrium $u_{it} - \hat{u}_{it} = w_{it} - \hat{w}_{it}$, and therefore Alesina and Angeletos (2005a) can rewrite:

$$\Omega_t = \tau_t^2 Var(\hat{y}_{it}) + (1 - \tau_t)^2 Var(y_{it} - \hat{y}_{it}) + 2\tau_t(1 - \tau_t)Cov(\hat{y}_{it}, y_{it} - \hat{y}_{it})$$

⁹For a complete description of inequality indexes formulation see Cowell (1998).

The tax rate is monotonically related to the *signal-to-noise ratio*, which depends on the policies in every period $s \leq t$. A society with high distortions, according to Alesina and Angeletos, will have high levels of inequality and a heavy wealth tax, which will stay constant over time. The optimal tax rate for generation t is given by $\tau' = \phi(\tau; E)$:

$$\begin{aligned} \phi(\tau; E) \equiv \arg \min_{\tau_t \in [0,1]} & \left\{ \frac{1}{2} \tau_t^2 - \tau_t \left[(1 - \tau_t) + \frac{\alpha(1 - \tau)}{1 - \alpha(1 - \tau)} (1 - \tau) \right] \Delta \right. \\ & + \gamma (1 - \tau_t)^2 \left[1 + \frac{\alpha(1 - \tau)}{1 - \alpha(1 - \tau)} \right]^2 \sigma_\eta^2 \\ & \left. + \gamma \left[(1 - \tau_t) \tau_t - \frac{\alpha(1 - \tau)}{1 - \alpha(1 - \tau)} (1 - \tau_t)(1 - \tau) + \frac{\alpha}{1 - \alpha} (1 - \tau)^2 \right] \sigma_\delta^2 \right\} \end{aligned}$$

Where σ_η^2 represents the variance of luck distribution, σ_δ^2 the variance of the combination of abilities and willingness to work $\delta = A_i^2 \beta_i$, and Δ the distance between the mean and the median voter.

2.6.1 ALESINA AND ANGELETOS VOTING FRAMEWORK AND ALTERNATIVES

Alesina and Angeletos (2005a) assume that the preferences for redistribution of the government coincide with the ones of the median voter. However, other voting frameworks could have also been applied: probabilistic voting, lobbying, or citizen candidate, with the possibility of changing the outcome of the policies. The decision about which voting system to choose, in fact, it is not neutral, as shown by Hassler et al. (2003). In what follows we present a comparison of the effects of different voting system on Alesina and Angeletos' (2005a) model.

MEDIAN-VOTER EQUILIBRIUM

Alesina and Angeletos (2005a) define the sufficient condition for the median-voter framework to be applied to their dynamic model as $\max_i \{A_i^2 \beta_i\} \leq 2 \int A_i^2 \beta_i di$, in this way the authors provide sufficient condition for the single-peakedness of voting preferences.

According to median-voter theorem if all citizens have single-peaked preferences on a sequence of alternative policies, than a Condorcet solution always exists and is the same one preferred by the median voter. The Condorcet winner is a policy capable of beating any other alternative policy in a pairwise vote. For the median voter to apply it is necessary to have single-peaked preferences, plus three conditions have to apply¹⁰:

1. Direct democracy - Citizens make the policy choices
2. Sincere Voting - Citizens vote the policy that gives them the highest utility
3. Open Agenda - Citizens vote over pairs of policy alternatives

According to Persson and Tabellini (2000), in the median-voter framework, a voter i decides to votes for a candidate (A) with certainty if the wealth that derives from party A preferred policy $W^i(g_a)$ is bigger than the wealth that derives from the other candidate (B) preferred choice $W^i(g_b)$, and vice versa. The probability of winning for party A is therefore:

¹⁰From Persson and Tabellini (2000)

$$p_A = \begin{cases} 0 & \text{if } W^m(g_a) < W^m(g_a) \\ \frac{1}{2} & \text{if } W^m(g_a) = W^m(g_a) \\ 1 & \text{if } W^m(g_a) > W^m(g_a) \end{cases}$$

The main implication of the median-voter is that the poorer the median voter, the higher the taxation is going to be, as in Meltzer and Richard (1981). However, in Alesina and Angeletos (2005a), this is not always the case, because of the effect of ideology. A more equal society with strongly egalitarian vision might redistribute more than a very unequal society which does not care about unfairness. In the next subsections, alternative voting frameworks are presented.

PROBABILISTIC VOTING

If the policies space is multidimensional, preferences are not single-peaked it becomes necessary for the probability of winning the elections p_A to become a smooth function of the distance between the two electoral platforms.

The probabilistic voting, introduced by Lindbeck and Weibull (1987) serves this purpose. Following Persson and Tabellini (2000) we define 3 groups of individuals: J=R,M,P respectively representing the rich, the middle class, and the poor. When individuals vote, they consider both the preferred policy of party A and B, as well as the candidates' ideologies. Each individual, in fact, will have a pro-party A ideological bias σ_i , and the all society will generally have an average relative preference for candidate A δ . Both σ_i and δ can be positive or negative, with δ uniformly distributed on support $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$, and σ_i uniformly distributed on support $\left[-\frac{1}{2\varphi^j}, \frac{1}{2\varphi^j}\right]$. Also, it is usually assumed that $\psi > \varphi^j$. In this case the probability for party A to win the elections will be a function of the distance of the wealth obtained under the policies of party A and B:

$$p_A = \frac{1}{2} + \frac{\psi}{\Phi} \left[\sum_j \alpha^j \Phi^j [W^j(g_a) - W^j(g_b)] \right].$$

where α^j represents the specific features of group j , and $\Phi \equiv \sum_j \alpha^j \varphi^j$ represents the average density across groups. Therefore in order to maximize the probability of winning both candidates will converge to the same platform, because the candidates are facing the optimization problem. Inserting a probabilistic voting framework in Alesina and Angeletos (2005a) model could allow for more robust equilibria, in fact the condition that guarantees single-peakedness of preferences $\max_i \{A_i^2 \beta_i\} \leq 2 \int A_i^2 \beta_i di$, would not be necessary, and even polynomials higher than grade 2 in the taxation would not represent an obstacle to the determination of the equilibria.

LOBBYING

In the median voter and probabilistic voting frameworks every individual has the same power. However, some individuals might exert pressure on the policy process, as in the case of lobbying. Assuming that some individuals jointly decide to give contribution to party A, then the candidate for party A could use the contributions to increase her popularity, changing δ , which in this case would be dependent on the ex ante popularity $\bar{\delta}$, and on the distance between the contributions made to party A (C_A) and the contributions made to party B (C_B):

$$\delta = \bar{\delta} + h(C_A - C_B)$$

The probability of winning the elections for party A becomes:

$$p_A = \frac{1}{2} + \psi \left[\sum_j \alpha^j W^j(g_a) - \sum_j \alpha^j W^j(g_b) + h(C_A - C_B) \right].$$

Since the campaign contribution is a cost for the individual, she maximizes the expected utility derived from the elections, minus the costs for contribution, which allows to obtaining the optimal campaign contribution:

$$C_A^J = \text{Max}[0, \psi h (W^j(g_a) - W^j(g_b))]$$

And candidate for party A will maximize the probability of winning given by:

$$\sum_j \alpha^j [\psi + O^j(\psi h)^2] W^j(g_a)$$

Where O^j is a dummy variable that takes values 1 if the group is organized and 0 if not. If all the groups (or no group) are organized, then the lobbying solution coincides with the one of the probabilistic voting framework. If, on the other side, only few groups are organized, then they will be able to tilt the equilibrium in their favour. If lobbying based on personal wealth was inserted in Alesina and Angeletos' (2005a) model, the results of the model itself would not necessarily change. For example, if rich citizen would have more political power, but would believe in the necessity for a fair society, than the lump sum tax could be even higher than in the case in which poor individuals who do not care about fairness would have higher political power.

However, if different cultures were introduced in the utility function (γ_1, γ_2) , with $\gamma_1 < \gamma_2$, then the fiscal policy would strongly be influenced by the lobby who gained more power. As the culture is directly related to redistribution (see Alesina and Glaeser, 2004), a society in which individuals who care strongly about fairness would be in power, would show a higher level of redistribution.

Median voter, probabilistic voting, and lobbying, all assume politicians interested only in being elected. However, it is possible for the candidates to be directly motivated by policy outcomes, like in the case of citizen-candidates *à la* Besley and Coate (1997). The first assumption is to have to candidate L and R , representing left-wing and right-wing, with $y^L < y^m < y^R$. The optimal voting behavior is exactly the same as the one in a median voter framework:

$$p_L = \begin{cases} 0 & \text{if } W^m(g_L) < W^m(g_R) \\ \frac{1}{2} & \text{if } W^m(g_L) = W^m(g_R) \\ 1 & \text{if } W^m(g_L) > W^m(g_R) \end{cases}$$

The candidate L announce the policy g_L that maximizes her expected utility:

$$E[W^L(g)] = p_L W^L(g_L) + (1 - p_L) W^L(g_R)$$

Where p_L is the probability for candidate L to win the elections. In this case there two forces a playing: a centrifugal force, which push the candidate towards pursuing a policy which coincides with her bliss point; and a centripetal force which pushes the candidate to move her announced policy towards the median voter preferred policy in order to increase the probability of winning the elections. The optimal strategy will be therefore to set g^L close enough to the preferred policy of the median voter g^m so that $p_L = 1$. The same strategy will be followed by the candidate R , so that the equilibrium is the same as the median-voter one.

However, if there is no perfect commitment, the solution of the citizen-candidate model will differ substantially from the solution of the median-voter model, and

might change the results in Alesina and Angeletos (2005a) model. With no commitment possible (as in Alesina 1988), after the elections, winning candidate would have incentive to pursue her bliss point. As no other per-electoral announcement would be credible, the candidate whose bliss point is closer to the median voter would win, assuming that the preferences are monotone on the individuals' wealth.

In this case it could be possible to have more extreme policies, with higher or lower tax rate compared to the one preferred by the median voter.

CHAPTER 3

THE EVOLUTION OF IDEOLOGY, FAIRNESS AND REDISTRIBUTION

3.1 INTRODUCTION

This chapter, co-authored with Alberto Alesina and Guido Cozzi, analyses the interactions between ideology and redistribution. The poor want to tax the rich, but that is not all what determines redistributive policies. Ideas about what is "fair" and about what is an acceptable level of inequality above and beyond the individuals' position in the income ladder also matter.¹ The same level of inequality may be more or less acceptable by different individuals in different countries depending upon their beliefs that wealth has been accumulated with effort and ability rather than by luck, connections or even corruption. In one word whether different levels of income and wealth are "deserved" or not. These views about inequality and justice (which we may label "ideology") determine tax rates and the evolution of the distribution of income and wealth. But the latter itself generates changes in the proportion of wealth inequality due to effort or to other factors including luck and government intervention, thus changing individual views about redistribution.

In this chapter we provide a politico economic model that can trace over time the evolution of policies (income taxes and bequest taxes and transfer schemes),

¹See for instance the recent survey of preferences for redistribution by Alesina and Giuliano (2010) and the references cited therein. Alesina, Di Tella and McCulloch (2004) discuss different levels of inequality tolerance in various countries. Alesina and Glaeser (2004) focus on a comparison between Continental Europe and US. Persson and Tabellini (2000) provide an excellent overview of politico economic models of redistributive policies.

the evolution of inequality, and of the political preferences for redistribution, as a function of the changes in what individuals perceive as fair and unfair wealth differences. The introduction of concerns for fairness reconciles several empirical observations which would be inconsistent with models based upon individual income (and position in the income ladder) as the only determinant of the voters' views about taxes and transfers.

In our model different generations of voters are linked by bequests, thus redistributive policies in the past and past beliefs about what was fair influence the current generation's preferences. We are especially interested in two issues. One is how different initial conditions lead to long lasting differences in policies. The other one is how shocks to inequality imply different policy reactions. Regarding the first issue we study not only differences in the initial conditions of the economic system, but also, and perhaps more interestingly, differences in views about social justice and about the fairness of the inherited level of inequality. For instance two countries may be completely identical except for their views about the fairness of their initial inequality, and as a result they may adopt different redistributive policies over a long period of time which determines different wealth and inequality dynamics. These different patterns of taxation, inequality, and growth would be completely unexplainable without reference to initial views about what is fair or not, i. e. about social justice. These examples allow us to explain, for instance, different levels of redistribution between the US and Europe and their persistence along the lines of Alesina and Glaeser (2004) who stressed, informally, the role of the perception of poverty as an explanation of US versus Europe. We also show that for some parameter values economies with different initial beliefs but otherwise identical converge slowly to the same steady state. Another implication of our model is that, contrary to standard result from the Meltzer and Richard's (1981) model, more inequality may

be associated with less redistribution. This is because different levels of measured inequality may be considered more or less fair.²

The second set of results concerns the effect of shocks to wealth inequality like those generated by wars (Piketty and Saez, 2003, and Atkinson, Piketty, and Saez, 2010) or possibly the 2007-2009 financial crisis (Saez, 2008). Sudden exogenous shocks to inequality may generate very different policy reactions depending on the perception of individuals about who lost and who gained, namely if those who lost were those who were rich because of "luck" (broadly defined) or were those who had become rich because of effort and ability. Thus the same changes in inequality may have different effects on redistributive policies depending on the nature of how these shocks are perceived. An innovative feature of our model is that we can trace not only the evolution of wealth, inequality, and redistributive policies, but also of the views about "fairness" in society, that is we can measure how much of the total inequality is considered fair at different points in time. We can also examine the effects of changes on people's views about fairness.

This chapter is related to the work of Alesina and Angeletos (2005a,b) but it is richer in its dynamic dimension and it uses a different voting mechanism. We adopt as our benchmark the same definition of fairness as theirs, but we also analyse different definitions and we emphasize the transition to the steady state, which may take a long time. Therefore, for the first time to our knowledge, we analyze the whole transition path for an ideology and redistribution model, which leads to a deeper understanding of the interactions between ideology, redistribution, and inequality. Also, differently from Alesina and Angeletos (2005a,b), which use a median voter model, we adopt a probabilistic voting framework, which is a more flexible tool to analyse various types of distribution of political influence, an issue which we

²See in fact Perotti (1996) and Bénabou (1996) for empirical evidence regarding this relationship.

explicitly explore in the present chapter. Finally, for the first time to our knowledge, we introduce the possibility for individuals to differentiate between income tax and bequest tax in relation to ideology.

Even though we assume that all families have the correct beliefs about the incentive structure in the economy, we can envisage a more complete version that incorporates Piketty's (1995) intra-dynasties evolution of heterogeneous beliefs about the incentive costs of redistribution. Here past experiences and views about history affect beliefs homogeneously within our stylized economy, because we intend to focus on the evolution of the aspect of ideology intended as the "fair" wealth distribution. Another possible extension should incorporate Bénabou and Tirole's (2006) important point, allowing beliefs to get shaped not only by the actual data, but also by individuals' psychological needs and objectives.

The present chapter is organized as follows. Section 3.2 describes the model: both the economy and the political aspects of it, and the equilibrium. Section 3.3 illustrates the dynamic evolution of the model and performs several experiments. Section 3.4 extends to bequest taxation alongside income taxation. The last section concludes. The Matlab codes used in the present chapter are available from the authors upon request.

3.2 THE ECONOMY

We have non overlapping generations of individuals, indexed by t . Population is constant, there is one active individual per-family, and the total mass of families is normalized to one. Each individual, indexed by $i \in [0, 1]$, lives for one period and is characterized by a certain degree of endurance to effort, $\beta_i > 0$, luck, $\eta_i \in R$, and innate abilities, $A_i > 0$; average luck is zero, that is $\int_0^1 \eta_i di = 0$. These

family-specific variables are assumed, for now, fully persistent over time. In an extension below we also allow for non persistent luck. Each individual i cares about consumption, c_{it} , and how much wealth to bequeath to the next generation, k_{it} - which we label "capital" - and negatively on his effort, e_{it} , on the job. All choice variables are constrained to be non-negative. The private utility function is:

$$u_{it} = \frac{1}{(1-\alpha)^{1-\alpha}\alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha - \frac{1}{2\beta_i} e_{it}^2,$$

$0 < \alpha < 1$. The final life gross wealth is:

$$z_{it} = A_i e_{it} + \eta_i + k_{it-1}. \quad (3.1)$$

For simplicity, capital is assumed to yield zero rate of return. Each generation votes on the tax rate, τ_t , which is proportionally applied to end-of-life gross wealth z_{it} ; all tax revenues are to be redistributed lump sum to all individuals. Note that we are imposing that income and bequest taxes are the same; in an extension below we allow for different tax rates on income and bequests and show that our results hold in that case as well. Hence, we denote final life post-tax and transfer wealth as:

$$w_{it} = (1 - \tau_t) z_{it} + G_t, \quad (3.2)$$

where $G_t = \tau_t \int_0^1 z_{it} di$ is the per capita transfer. The government budget is always balanced. Notice that in our stylized economy, individual income is $y_{it} = (A_i e_{it} + \eta_i) (1 - \tau_t) - \tau_t k_{it-1} + G_t$, and the aggregate income of generation t is:

$$Y_t = \int_0^1 [(A_i e_{it} + \eta_i) (1 - \tau_t) - \tau_t k_{it-1} + G_t] di = \int_0^1 A_i e_{it} di,$$

which is identical to per capita income due to the population normalization.

The warm glow intergenerational altruism implies that fraction α of end of life wealth is bequeathed, as seen by maximizing u_{it} subject to $c_{it} + k_{it} = w_{it}$. Therefore, plugging the optimal consumption and bequest into the private utility function, we obtain:

$$u_{it} = w_{it} - \frac{e_{it}^2}{2\beta_i}. \quad (3.3)$$

Individuals vote on taxation at the beginning of life, before deciding on effort. Maximizing u_{it} , using (3.3), (3.1), and (3.2), gives:

$$e_{it} = (1 - \tau_t)A_i\beta_i,$$

which shows that individual effort gets discouraged by expected taxation, and is increasing in the individual work ability and decreasing in the disutility of effort³.

The definition of a period needs discussion. In the model the period is one generation and it is also the length of time for which the redistributive policy cannot be changed. We solve the model below by computational methods and not in closed form. Therefore it would be relatively straightforward to allow many periods within one generation and allow for a vote on a tax rate in every period, so many votes and possibly many tax changes within one generation. However, this complication would make the interpretation of the simulations heavier without adding much to the basic message of the chapter. In addition, the choice of a "tax rate" should not be interpreted as the day to day or year to year changes in fiscal policy, but the broad redistributive stand of a certain period in a certain country. For instance more

³As in Heckman (2008), we could distinguish between cognitive abilities (here summarized by A_i) and non-cognitive abilities ($1/\beta_i$).

redistribution in the US with the Great Society in the Sixties, or with the New Deal in the Thirties, less redistribution starting with Reagan in the Eighties and what followed. In Europe an increase in redistribution at the end of the Sixties, possibly a slowing down today etc.

3.2.1 INEQUALITY AND FAIRNESS

In addition to the standard utility function described above, we postulate that utility also depends negatively on some measure of inequality, i.e of wealth dispersion in society. In our benchmark case, as in Alesina and Angeletos (2005a) we posit that individuals tolerate inequality coming from innate ability and effort, but are averse to inequality arising from everything else, luck and redistribution.

More specifically, let us define "fair" utility and wealth as follows:

$$\begin{aligned}\widehat{u}_{it} &= \widehat{w}_{it} - \frac{e_{it}^2}{2\beta_i}, \\ \widehat{w}_{it} &= A_i e_{it} + \widehat{k}_{it-1}.\end{aligned}$$

Remembering that each individual chooses $k_{it} = \alpha w_{it}$, where α represents the generosity towards the next generation, we define fair consumption, fair bequest, and fair disposable wealth as:

$$\widehat{c}_{it} = (1 - \alpha)\widehat{z}_{it} \quad \widehat{k}_{it} = \alpha\widehat{z}_{it} \quad \widehat{z}_{it} = \widehat{w}_{it} = A_i e_{it} + \widehat{k}_{it-1}. \quad (3.4)$$

The generation t individual i utility, U_{it} , is defined as:

$$U_{it} = u_{it} - \gamma \Omega_t, \quad (3.5)$$

where

$$\Omega_t = \int_0^1 (u_{jt} - \widehat{u}_{jt})^2 dj = \int_0^1 (w_{jt} - \widehat{w}_{jt})^2 dj. \quad (3.6)$$

and $\gamma > 0$ is the parameter which measures the importance of unfairness for society. This representation of utility implies that individuals in society dislike deviations from a distribution of wealth/utility in which everybody gets only the benefits from effort and innate ability. Note that the difference between total wealth and fair wealth is due to luck and government intervention with taxes and transfers. The higher the tax rate, the lower the equilibrium choice of effort; therefore the larger is the percentage of individual income due to luck rather than effort⁴, and the larger the proportion of differences across individuals due to luck rather than effort. In addition, to the extent that government transfers are not included in the definition of fair luck because not due to effort, this is an additional channel through which higher taxes induce a higher proportion of wealth perceived as not fair over the fair portion.

3.2.2 CHOICE OF UTILITY FUNCTION AND ALTERNATIVE MODELLING

In this chapter, following Alesina and Angeletos (2005a), we use a quasi-linear private utility function. The advantage of using such a formulation is that it allows us to find a simple solution, not only for the optimal level of capital and consumption, but also for the optimal level of effort, which linearly negatively depends on taxation, and

⁴Notice that, for unlucky individuals, that percentage has opposite sign.

positively of abilities and willingness to work: $e_{it} = (1 - \tau_t)A_i\beta_i$. This solution allows us to arrive to a simple formulation also for the total utility, keeping the notation short, and helping analytically and computationally to find meaningful solutions.

However, it would be possible to transform the utility function without losing the main properties of optimal effort, capital, and consumption. A simple transformation of the type:

$$\tilde{u}_{it} = f(u_{it}) = \left(\frac{1}{(1 - \alpha)^{1-\alpha} \alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha - \frac{1}{2\beta_i} e_{it}^2 \right)$$

where f is a positive function of the utility. This would be a non-linear transformation, valid as long as the expression in the logarithm is positive, keeping the function quasi-linear and maintaining its optimal solutions about effort, capital, and consumption.

A logarithmic form of the type:

$$\tilde{u}_{it} = \ln \left(\frac{1}{(1 - \alpha)^{1-\alpha} \alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha \right) - \frac{1}{2\beta_i} e_{it}^2$$

would imply the same level of optimal capital and consumption, according to the parameter α . However, the optimal level of effort would be a lot more complicated:

$$\begin{aligned} \tilde{e}_{it} &= (1 - \tau_t)(\eta_i + k_{it}) + G_t \\ &+ \left\{ -((1 - \tau_t)(\eta_i + k_{it}) + G_t)^2 + 4\beta_i A_{it}(1 - \tau)^2 \right\}^{\frac{1}{2}} \\ &\times \{A_{it}(1 - \tau)\}^{-1} \end{aligned}$$

In this case, the effort would not only depend negatively on taxation τ_t , positively on abilities A_i , and willingness to work β_i , but it would also depend non linearly on

the transfers G_t (which also contain τ_t), luck η_i , capital inherited from the previous generation k_{it} . Moreover, a rational solution for the effort might not even exist.

If we would, on the other hand, define a formulation of the type:

$$\overleftrightarrow{u}_{it} = \ln \left(\frac{1}{(1-\alpha)^{1-\alpha} \alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha \right) - \ln \left(\frac{1}{2\beta_i} e_{it}^2 \right)$$

the optimal effort would have a simpler formulation, but it would still depend on taxation τ_t , abilities A_i , transfers G_t (which also contain τ_t), luck η_i , and capital inherited from the previous generation k_{it} .

$$\overleftrightarrow{e}_{it} = \frac{2(k_{it} + \eta_i)}{(1-2)} - \frac{G_t}{(1-\tau_t)A_{it}(1-2)}$$

However, in this case it would be simple to calculate the first derivative of the optimal effort \overleftrightarrow{e} with respect to the taxation τ_t once we substitute $G_t = \tau_t \int_0^1 [A_j e_{jt} + k_{jt-1}] dj$

$$\frac{\partial \overleftrightarrow{e}_{it}}{\partial \tau_t} = - \frac{\int_0^1 [A_j e_{jt} + k_{jt-1}] dj}{(1-\tau_t)^2}$$

Therefore the optimal effort would be anyway a decreasing function of τ_t , and our results would be robust to this transformation.

3.2.3 ALTERNATIVE DEFINITIONS OF FAIRNESS

In our definition of fairness we assume that unfairness can arise because of the existence of luck η_i or because of the bequest given by the parents k_{it} derives from unfairness. While the fair value of k_{it} varies, the only fair value of luck is 0. In

most of the thesis we assume that luck is perfectly inherited from the parent, but we also introduce, in section 3.6, the possibility for stochastic luck distribution to be randomly assigned in every generation. In this case, it is possible to observe the case in which an individual has average luck $\eta_{it} = 0$, but her parent has positive luck $\eta_{it-1} > 0$. In this case, even if the child herself is not lucky, she might be considered lucky because her parent was.

If instead, (as we will show in section 3.4) we assume that the only fair bequest in each generation is the average one $\hat{k}_{t-1} = \int k_{jt-1} dj$, then an individual with zero luck could still be lucky because her parent was lucky $\eta_{it-1} > 0$ or because her parent had a high level of innate abilities A_{it-1} , or high endurance to effort β_{it-1} . In all these cases the result would be a high level of bequest.

If it is not possible to distinguish amongst the nature of wealth of one's parent, then agents would be, for what concerns bequest, favorable to a complete egalitarian distribution. The reason is that even if the higher bequest would derive from the parent's effort, rather than the parent's luck, it would make no difference in the voting preferences of the subsequent generation. Considering any form of differences in bequest unfair would cause stronger ideology in societies and bring about higher taxation and lower per capita wealth, as we will show in section 3.4.

In the numerical simulations of the model we investigate also for other definitions of fairness. First we consider the case in which tax and transfers are considered part of fair wealth. Second, we look at cases in which the effect of A_i is part of luck. One may argue that being born smart is part of a sort of genetically induced "luck". Alternatively one may argue that intelligence is fostered by growing up in a rich family with more child care and investment in education⁵. Finally we consider the case in which individuals dislike inequality *per se*, namely any deviation of wealth

⁵We consider innate abilities only, which are perfectly inherited from the parent. In more complex models it is possible to distinguish between genetic heritage and social heritage. Hassler and Rodriguez Mora (2000) distinguish between intelligence, which is a

and utility from equality for all at the average is costly. The latter would be an extreme definition of fairness in which any difference in wealth even if arising from harder work and more effort is unfair.

3.2.4 THE POLITY

We use a probabilistic voting model⁶. There are two parties - L , for "left", and R , for "right" - each of which simultaneously and credibly commits to a tax rate $\tau_P \in [0, 1]$, $P = L, R$, at the beginning of each period - coinciding with a generation. The individuals vote for a party at the beginning of their life. Then the individuals choose efforts. The party that obtained the majority of the votes is the only one in office, and it will apply the announced tax rate and will redistribute accordingly. Finally, individuals choose their consumption and bequest. Individuals have heterogeneous degrees of political party identification: the complete utility function including economic variables and party identification is the following:

$$\tilde{U}_{itP} = u_{it} - \gamma\Omega_t + (\sigma_{it} + \varepsilon_t)\chi_L(P), \text{ where } P = L, R.$$

Variable P denotes the party that wins the election, and can be L (meaning "left") or R ("right"). Indicator function $\chi_L(P)$ is 1 if $P = L$ and 0 if $P = R$. Random variable σ_{it} represents individual i 's pro-party L ideological bias, while ε_t is an aggregate random variable capturing party L 's popularity for generation t . While we assumed (for simplicity) that individuals' pecuniary utility and ability shocks are

genetic heritage less the perfectly correlated through generations; and social assets, which consists in knowledge transmitted from parents to children.

⁶Note that this voting model, due to Lindbeck and Weibull (1987,1993) does not require single peakness of preferences .

For the implications of using probabilistic voting model, compared to simple majority voting and lobbistic model see Hassler et al. (2003).

fully persistent across generations, that is $\beta_{it} = \beta_i$, $\eta_{it} = \eta_i$, and $A_{it} = A_i$, political popularity may change from generation to generation both at the aggregate and at the family level. Each generation, ε_t will be uniformly distributed on support $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$, and individual specific variables σ_{it} are uniformly distributed on support $\left[-\frac{1}{2\varphi_i}, \frac{1}{2\varphi_i}\right]$. All random variables are independent. Therefore, in the support of the corresponding distributions, the density function of aggregate popularity of party L is $\psi > 0$, and family-specific density functions are $\varphi_i > 0$, with the correlated (aggregate) component of the party identification assumed less variable than the individual components - that is $\psi > \varphi_i, \forall i \in [0, 1]$. The two parties commit to their tax rates before they know the realization of the random variables ε_t and σ_{it} . They only care about winning the election, and hence choose their policies τ_t^L and τ_t^R by trying to maximize the probability of being elected, $p_P, P = L, R$. This is consistent with maximizing the expected rents from being in office⁷.

The "popularity shocks" should not be viewed as the day ebbs and flows of electoral politics. Given our definition of a period as one generation these shocks should be seen as long term switches of one generation to the left (say the sixties) or to the right⁸, (say the eighties in the US).

3.2.5 EQUILIBRIUM

After simple substitutions, and momentarily neglecting the party L bias components, we obtain the indirect utility function of each individual in each generation. That function ultimately depends on exogenous parameters, on expected taxation and on all the wealth distribution of the previous generation:

⁷Let $\Pi^P > 0$ denote the (non-transferable) ego rent of party $P = L, R$, from being in office, the expected rent of party L will be $\Pi^L p_L = \Pi^L(1 - p_R)$; whereas party R maximizes $\Pi^R p_R = \Pi^R(1 - p_L)$.

⁸See Song (2008) for an interesting model of political economy under persistent political ideology shocks.

$$\begin{aligned}
U_{it} &= [\delta_i(1 - \tau_t) + \eta_i + k_{it-1}](1 - \tau_t) + \int_0^1 [\delta_j(1 - \tau_t)\tau_t + \tau_t k_{jt-1}] dj - (1 - \tau_t)^2 \frac{\delta_i}{2} \\
&\quad - \gamma \int_0^1 \left[\frac{(\delta_s(1 - \tau_t) + \eta_s + k_{st-1})(1 - \tau_t)}{\delta_j(1 - \tau_t)\tau_t + \tau_t k_{jt-1}} + \int_0^1 (\delta_j(1 - \tau_t)\tau_t + \tau_t k_{jt-1}) dj - \delta_s(1 - \tau_t) - \hat{k}_{st-1} \right]^2 ds \\
&\equiv \hat{U}_{it}(\tau_t).
\end{aligned} \tag{3.7}$$

Where $\delta_i \equiv A_i^2 \beta_i$. The proof of Lemma 3.1 is in the Appendix.

Lemma 3.1. *In pairwise majority voting, there will exist a unique equilibrium in which the two parties will select the same policy variable, $\tau_t^L = \tau_t^R \equiv \tau_t^*$, given by*

$$\tau_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di. \tag{3.8}$$

As in other probabilistic voting models, the same equilibrium policy variable would also be chosen by a biased social planner who maximized the following weighted aggregate welfare functional:

$$W(\tau) \equiv \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di,$$

with each individual's indirect utility function (where effort, consumption, and bequest are all optimal) being weighted inversely to vulnerability, $1/\varphi_i$, to party-related attributes. In the special case of individuals who have the same densities $\varphi_i = \varphi$, Lemma 3.1 implies that $\tau_t^* = \arg \max_{\tau_t} W(\tau_t)$ would coincide with the tax rate chosen by a social planner who adopts a utilitarian welfare functional. Notice that, from eq. (3.7), the equilibrium tax rate τ_t^* will depend on generation $t - 1$'s

bequest distribution k_{t-1} , generation $t - 1$'s fair bequest distribution \widehat{k}_{t-1} , and of course on the parameter vectors δ and η ; that is $\tau_t^* = \tau^*(k_{t-1}, \widehat{k}_{t-1}, \delta, \eta)$.

3.2.6 INTERGENERATIONAL LINKS

The equilibrium tax rate τ_t^* determines the level of capital and fair capital for each family of the current generation. Therefore the link between different generations is summarized by the dynamics of k_{it} and \widehat{k}_{it} . The intergenerational link k_{it} is derived, for each individual, from substituting the level of wealth w_{it} inside the optimal level of capital derived from the private utility optimization u_{it} :

$$\begin{aligned} k_{it} &= \alpha w_{it} \\ &= \alpha \{ [\delta_i(1 - \tau_t) + \eta_i + k_{it-1}] (1 - \tau_t) + G_t \} \end{aligned} \tag{3.9}$$

At the same time it is possible to obtain a fair intergenerational link \widehat{k}_{it} substituting the level of fair wealth \widehat{w}_{it} inside the optimal level of fair capital derived from the private utility optimization \widehat{u}_{it} :

$$\begin{aligned} \widehat{k}_{it} &= \alpha \widehat{w}_{it} \\ &= \alpha \{ \delta_i(1 - \tau_t) + \widehat{k}_{it-1} \}. \end{aligned} \tag{3.10}$$

The level of fair bequest does not include any income derived from luck, nor any change in wealth caused by the government, in the form of taxes and redistribution. Fair bequest depends, in fact, only on the intergenerational generosity parameter α , on the effort exerted by the individual $\delta_i(1 - \tau_t)$, and on the fair capital that her

parent had inherited \widehat{k}_{it-1} . Therefore, ideas about what is fair are built partially according to the parents ideas, and partially are derived from personal characteristics and current taxation. There is a double link between ideology and taxation: on the one hand ideology influence voting preferences, and on the other hand redistribution helps shaping future ideas of what can be considered fair.

A possible criticism is why we use an atemporal utility function, and then insert intertemporal fair bequest value, rather than solving a dynastic economy. The reason is to be found in the fair bequest: in every generation a new distribution of fair bequest is derived. The distribution of fair bequest, for each family, evolves with time, and influences the preferences for redistribution of the entire community. When voting, individuals will not only look at their level of fair bequest (let's say compared to the average), but at all the levels of fair redistribution for each individual. This implies that in order to solve a dynastic economy we should be able to define, in the first generation, the whole distribution of capital, and fair capital for an infinite number of generations.

Based on these dynamic equations, we notice that the distribution of δ_i should be high enough relative to the support of the distribution of η_i in order for final life wealth never to be negative⁹. In all our simulations, the relative importance of mere luck is never overwhelming, and hence the non-negative final life wealth constraint is never violated.

3.2.7 DISCUSSION

Note that in eq. (3.10), “fair” bequests - i.e. fair initial wealth distribution, over the generations - are obtained by removing from the parental end of life wealth, the effects of the “luck” variable, η_i , and of the taxes paid to and transfers received

⁹See Lemma 1.2 in the Appendix for a sufficiency condition.

by the government. However, the indirect effect of tax rates on individual efforts is included in this definition of fairness. The reader may wonder why " $(1 - \tau_t)$ " should enter the "fair wealth": after all, it is an individually rational response to the distortion induced by taxation, and indeed $e_{it} = (1 - \tau_t)A_i\beta_i$. If redistribution did not exist in the model, the individual would have exerted a first best effort level $e_{it}^F = A_i\beta_i$. We have run simulations under such a different view of fairness, based on "potential" rather than actual efforts, without much change in the results about the dynamics of k_{it} . By eq. (3.10), it simplifies the dynamics of \hat{k}_{it} , which would tend to $\frac{\alpha\delta_i}{1-\alpha}$. However, the results of our computations do not change qualitatively.

A second objection could be raised against using additive luck η_i and multiplicative abilities A_i . Formally, luck enters additively while ability as the marginal product of effort: both could be viewed as "gifts of nature". Replacing A_i with $\bar{A} = \int_0^1 A_i di$ would both be reasonable and consistent at the macroeconomic level (fair value added = actual value added). Using $\bar{A}e_{it} = \bar{A}(1 - \tau_t)A_i\beta_i$ as the valued added component of the end-of-life wealth, however, would not change the qualitative results much, as actual individual ability, A_i , would still enter multiplicatively indirectly via optimal effort choice. Purging this effect too, in addition to neglecting macroeconomic consistency, would not change much¹⁰. Hence we can say that all the main qualitative results from the simulations are robust to the introduction of multiplicative luck, provided that also additive luck is present.

A third objection could be raised against considering β_i always fair, as also this could be considered as something that does not depend on individuals choices but enhances their wealth. Assuming β_i as unfair would imply that the effort would be positively driven by an unfair component: as long as β_{it} enters multiplicatively

¹⁰Notice that, while in the previous case replacing A_i with its expected value in the direct abilities reduced the variance of δ_i (due to the elimination of the quadratic exponent on abilities), eliminating the variance of A_i completely could even increase the variance of δ_i .

in the optimal effort, higher levels of endurance to work β_i would translate into high level of effort. Moreover, unlike A_i , β_i only enters in the utility function via the effort. In this case we would have to distinguish between an actual level of effort $e_{it} = (1 - \tau_t)A_i\beta_i$, and a fair level of effort, in which everyone have the same endurance to work $e_{it}^F = (1 - \tau_t)A_i\bar{\beta}$. Using this formulation would slightly increase the measure of unfairness $\Omega_t = \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj$, which in this case would become:

$$\Omega_t = \int_0^1 \left[\begin{aligned} & (A_s^2\beta_s(1 - \tau_t) + \eta_s + k_{st-1})(1 - \tau_t) - (1 - \tau_t)^2 \frac{A_s^2\beta_s}{2} \\ & + \int_0^1 (A_s^2\beta_s(1 - \tau_t)\tau_t + \tau_t k_{jt-1})dj - A_s^2\bar{\beta}(1 - \tau_t) - \hat{k}_{st-1} - (1 - \tau_t)^2 \frac{A_s^2\bar{\beta}}{2} \end{aligned} \right]^2 ds$$

Qualitatively, our results would not change. Quantitatively we would obtain a higher level of unfairness that would imply higher taxation, whose purpose would partially be to discourage effort.

Finally, an objection could be about the role of luck: it does not bear any productive contribution, not only because it has sum-zero $\int \eta_j dj = 0$, but also because it is additive with respect to the capital and effort. In particular, if luck could influence abilities A_i or willingness to work β_i the situation would be different. In that case luck would have an effect on aggregate production, according to its correlation to abilities and/or willingness to work. Therefore, luck would not be anymore something that simply redistributes wealth among individuals, but instead some kind of ability/willingness to work enhancer, and its interpretation should change drastically: it could not anymore represent corruption and criminality, which do not add to a nation's wealth, but it would represent a stricter definition of luck, and its effect could be distinguished from the abilities and/or willingness to work.

3.3 INTERGENERATIONAL DYNAMICS

Starting from an initial vector of actual and fair wealth levels, $(k_{i0}, \hat{k}_{i0})_{i \in [0,1]}$, we can iterate the model and determine the intergenerational evolution of $(k_{it}, \hat{k}_{it})_{i \in [0,1]}$ and τ_t^* for all $t \in N$. We use equations (3.7), problem (3.8), and eq.s (3.9) and (3.10), which, once iterated for an arbitrary number of generations, allows to calculate the sequence of equilibrium values of the endogenous variables of our dynamic economy for all parameter vectors, initial wealth distribution, and initial fair wealth distribution. By simulating the model for a sufficiently high number of generations, we can approximate the stable steady state value of the endogenous variables associated with each initial condition.

Generation t 's pair of distributions $(k_{it}, \hat{k}_{it})_{i \in [0,1]}$ describe the interaction of real and "ideal" variables at time t . More precisely, the comparison between how society currently is - the actual distribution $(k_{it})_{i \in [0,1]}$ - and how society thinks it "should be" - the fair distribution $(\hat{k}_{it})_{i \in [0,1]}$ - sets the goals of the political action; together with the method of political competition - i.e. pairwise majority voting - this describes the political ideology prevailing for generation t in that economy. The resulting political equilibrium generates the evolution of $(k_{it+1}, \hat{k}_{it+1})_{i \in [0,1]}$, and therefore the political ideology (i.e policy goals) prevailing in the next generation. Thus we trace the evolution of ideology, fairness and redistribution, as well as the aggregate GDP per capita. We focus our attention on the effects of:

1. different initial beliefs about the fair wealth distribution (sub-section 3.3.1).
2. different initial inequality (section 3.3.2).
3. alternative definitions of fairness (section 3.3.3).
4. alternative definitions of fair capital (section 3.3.4)
5. different initial levels of aggregate wealth and poverty traps (section 3.3.4).
6. temporary shocks to wealth inequality (section 3.3.5).

7. bequest taxation (section 3.4.1.1).

It should be noticed that in our experiments, throughout this dissertation, we simulate the economy for several generation without calibrating any parameter. The reason for this choice is to be found in the very nature of the model: it is made to describe a long run evolution rather than short run cycles. Moreover, given the presence of ideology, private utility has to be necessarily relatively simple in its notation. As a result only two parameter are present in the model: α , and γ . Finally, the main reason to perform the experiments is to analyze how general countries would react to certain shocks, and calibrating the two parameters could certainly add to the understanding of a single specific country, but would not add qualitatively to our general results.

3.3.1 DIFFERENT INITIAL IDEAS ABOUT SOCIAL JUSTICE

A society where citizens believe that the observed cumulated wealth differences are derived from previous family luck will choose to redistribute more than a society in which voters think that the current capital accumulation depended on past efforts and talents. In Europe, preexisting forms of feudalism and wealth related to nobility differed from the US, where modern capitalism developed without a long previous history of privilege and class differences.

In this section, we simulate the dynamics of two societies, characterized by identical real economic and personal characteristics, but with *different initial ideas* of the fair wealth distribution. In the first country, A , every individual of generation 0 believes that all the inequality is unfair, namely the initial wealth levels of their cohort should be equal to be fair. At the other extreme, the citizens of country B are initially convinced that the prevailing capital distribution is exactly the fair one. Figure 3a shows two economies, identical in all market fundamentals, including

inequality, but that at some point in their history a generation is born and it judges differently the (same) prevailing wealth distribution. In fact, our "period zero" is simply the start of our period of interest, but, of course, a long history might have preceded the "initial generation" we are considering, which otherwise would have started with no initial capital. Therefore a different way of interpreting these results is this: all of the sudden in an unexpected matter a new generation is born with extremely egalitarian views, with a break of the past. Thus we study how a new egalitarian generation of individuals might affect the resulting political equilibrium and economic performance over the subsequent generations.

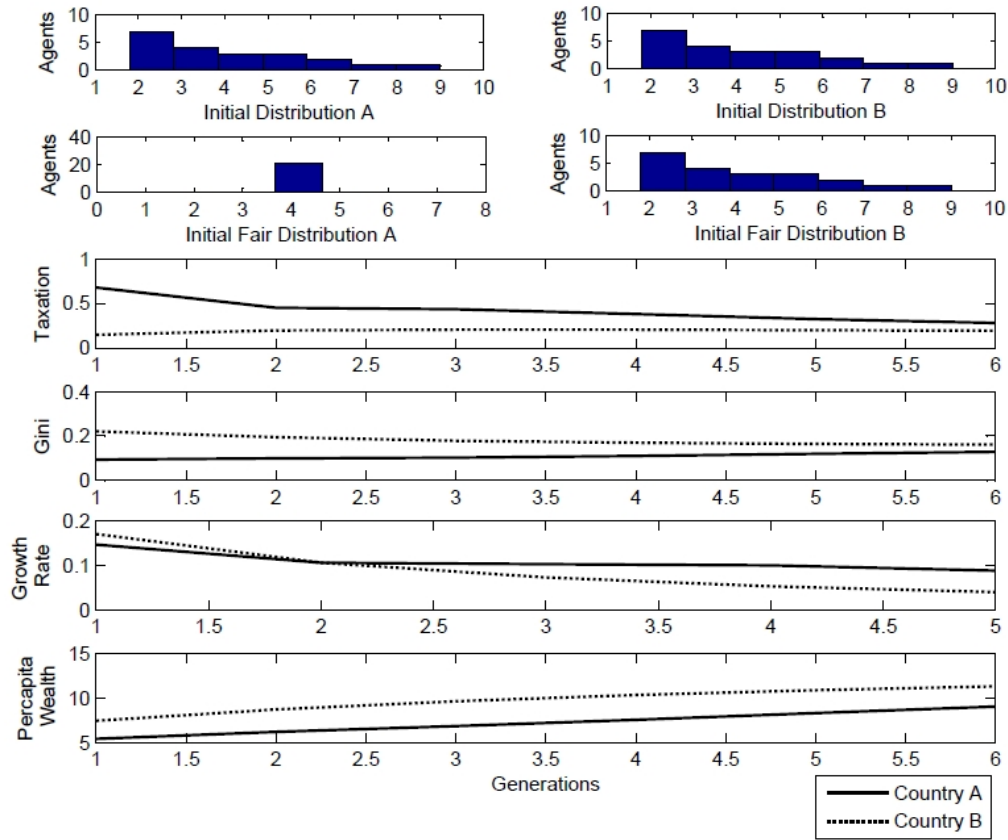


Figure 3.1a: Different Initial Ideas of Fairness

Figure 3.1a shows that, as a consequence of their perception of unfairness in the initial wealth distribution, country A 's voters chose a high tax rate in period zero. Meanwhile, this does not take place in country B , where as a consequence work effort is higher and capital accumulation faster. Individual preferences and the equilibrium tax rate ("ideology") evolve from generation to generation. Consider country A . The first generation judges all inequality unfair; the second generation will believe their parents' ideal of their generation's fairness, but it will attribute part of the current pre-tax inequality to the efforts and abilities of their generation's members: therefore the desired tax rate will be lower. The high tax rate chosen by the first generation in country A will induce a relatively low choice of effort and work, and therefore the percentage of individual wealth due to luck is relatively high, thus the tax rate desired by generation 1 will still be relatively high. In country B the first generation will not tax inequality because they perceived it as fair but the chosen tax rate will not be zero due to the need for correcting the effect of luck on unfairness within their cohort. But then the following generation will perceive that some of the inherited inequality is due to luck and therefore will choose to tax it. Since the initial tax rate was quite low much of the inequality within generation 1 will be due to effort, not luck, and therefore the chosen tax rate will not be much higher than in period zero. This shows that the two countries will remain rather different in terms of policy goals and tax/transfer redistributive schemes for many periods/generations. Initial conditions matter much. Policy goals (ideology) evolve over time together with the evolution of the economy, but initial differences in perception imply long lasting differences across countries.

More precisely, let us review the evolution of ideology implicit in eq. (3.10): $\widehat{k}_{it} = \alpha \delta_i (1 - \tau_t) + \alpha \widehat{k}_{it-1}$. Individuals belonging to generation t believe that every member of their cohort should bequeath a wealth level that reflects the bequest parental choice of a fraction, α , of their end of life wealth; however that fraction should have

been taken provided they earned the "fair" end-of-life wealth, given by $\widehat{z}_{it} = \delta_i(1 - \tau_t) + \widehat{k}_{it-1}$. Thus individuals believe in the idea of fairness of their parents (as from the presence of " \widehat{k}_{it-1} " in the formula); however, since the term " $\delta_i(1 - \tau_t)$ " is just the equilibrium value of $A_i e_{it}$, they also believe that the additional "fair" income of their peers should only arise from their individual efforts and productive abilities. Since, in turn, the effort chosen by the individual turns out to be equal to $e_{it} = (1 - \tau_t)A_i\beta_i$, its level will also reflect the individual's love for work, indeed represented by β_i . Thus the view of fair versus unfair inequality evolves from generation zero to generation 1 and this will imply different choices of tax rates and different bequests. The same considerations apply in the transition from generation 1 to 2, and one can simulate the model forward to trace the transition to a steady state.

As shown in Figure 3.1b, we can keep track of the level of the variance of the wealth distribution viewed as fair by all the future generations in country *A*: as we can see, that level increases over time. The offspring of a very egalitarian generation, though agreeing with their parent's view of the world of their times, by critically assessing the productive participation by their peers, will become increasingly more tolerant of wealth disparities.

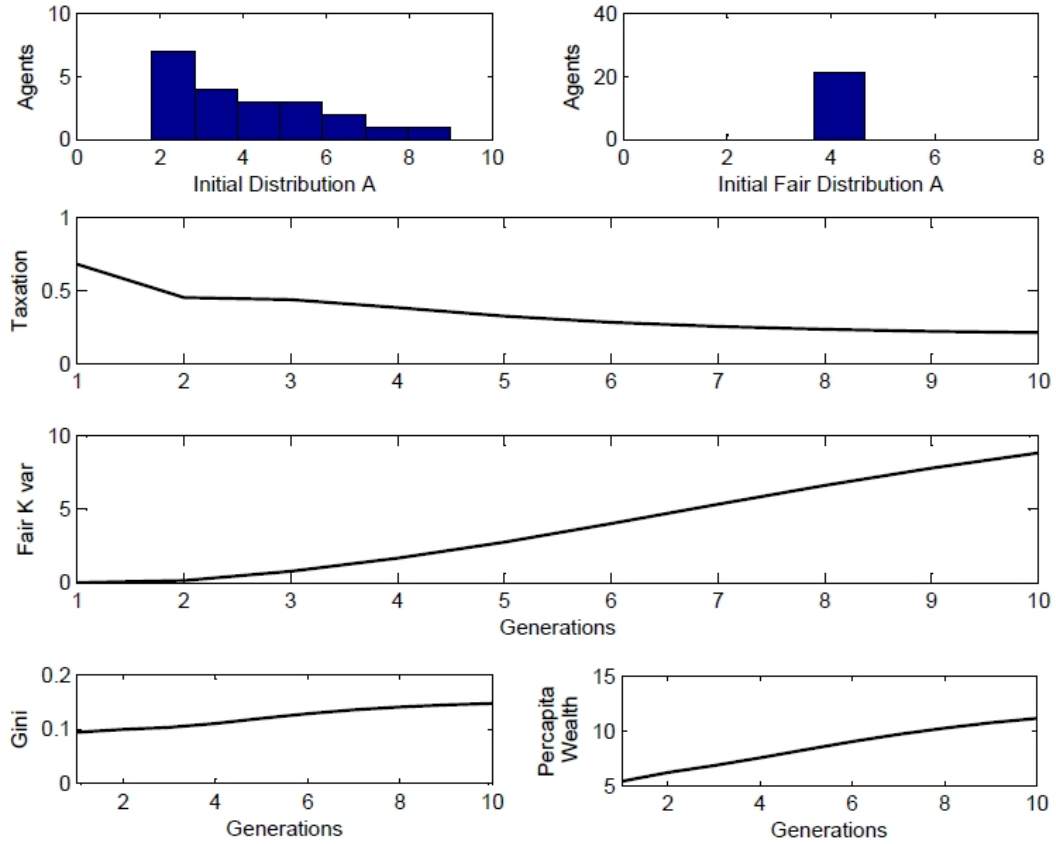


Figure 3.1b: Evolution of Unfairness

For some parameter values we have multiple steady states. In such cases, the strictly egalitarian ideology prevailing in an initial generation in country *A* can support very strong redistributive policies. High enough taxation would then discourage individual efforts so dramatically that a large part of individual's wealths would be the result of luck, and hence deemed very unfair. Therefore, the next generation would decide to tax a lot as well. In the long run the unfairness/redistribution/poverty trap would never be corrected, and the two economies would differ in everything, with country *B* richer, but more unequal, than country *A*.

3.3.2 INITIAL INEQUALITY

In a dynamic version of the Meltzer and Richard's (1981) model, higher initial inequality leads to more redistribution, higher taxes and lower capital accumulation and growth (Alesina and Rodrik (1994), and Persson and Tabellini (1994)). It is straightforward to reproduce this result in our framework. Imagine two countries with different initial level of inequality, associated with their different initial capital distributions, each viewed as fair in each country; all parameters are the same in both countries. Then there would be higher taxes and more redistribution in the country with more inequality. Simulations along those lines are available from the authors.

However, Perotti (1996) first and then others have questioned empirically, the positive correlation relationship between more pre tax inequality and redistribution.¹¹ A negative correlation between initial inequality and redistribution can be easily obtained in our model. Imagine two countries, with different levels of initial inequality, but suppose that in the country with more inequality the latter is considered fair, while in the other country the inequality, even though lower, is considered unfair. Imagine also that in the second country the parameter γ is especially high, namely in this country citizens are especially averse to inequality (unfairly induced). One can easily generate examples in which more inequality leads to less redistribution. One needs different ratios of fair versus unfair inequality and/or different weights given in the two countries to the cost of inequality and unfairness.

Another reason why inequality may not lead to more but less redistribution is the case when more inequality leads to a stronger influence of rich voters in the political equilibrium.¹² So far, in our probabilistic voting framework, we have

¹¹See also Bénabou (1996) for a survey.

¹²Bénabou (2000) analyzes the departures from “one person, one vote”, considering even the opposite “one dollar, one vote”. Using results from Rosenstone and Hansen (1993) he empirically studies how the representation ratio in politics varies across socioeconomic

worked under the assumption of common values of φ_i for all $i \in [0, 1]$. However, this may not be the case, as different voters are differently reactive to the parties' announcement of different policies, based on the relative importance they give to ideological and personal characteristics associated with the different parties. Our model allows all possible assumptions about the individual political biases. When the rich have larger political influence and when wealth is correlated to more political influence redistribution is lower. This will of course imply higher growth and a larger Gini. All the simulations regarding these cases are available upon request.

3.3.3 DIFFERENT VIEWS ABOUT WHAT IS FAIR

In this section we analyse the effects of different views about fairness, by comparing three countries.

1) Country A is our benchmark case and we assume $\gamma = 0.1$. Thus individuals in country A have preferences described by eq.s (3.5) and (3.6);

2) In country B $\gamma = 0$. This is the traditional Meltzer-Richard case in which redistribution occurs only for selfish reasons, namely the poor want to tax the rich and there is no distinction between fair and unfair inequality;

3) In Country C , individuals are averse to inequality *per se*, as measured by the variance of end-of-life post-tax wealth, w_{it} , that is individuals in country C have preferences for redistribution in which:

$$\Omega_t^C = \text{var}(w_{it}). \quad (3.11)$$

groups. The disparities turn out to be quite striking especially with respect to contributions for the political campaign. By incorporating this in a political economy model, the conclusion is that an increase in inequality can make the system more pro-wealth biased, with a consequential reduction in the redistribution. See also Karabarounis (2010) for cross country empirical evidence on this point, and Mc Charty, Poole, and Rosenthal (2008) for a discussion on the United States.

In Lemma 3.1 we compare the performance of economies with everything else equal, but the three different concepts of social justice.

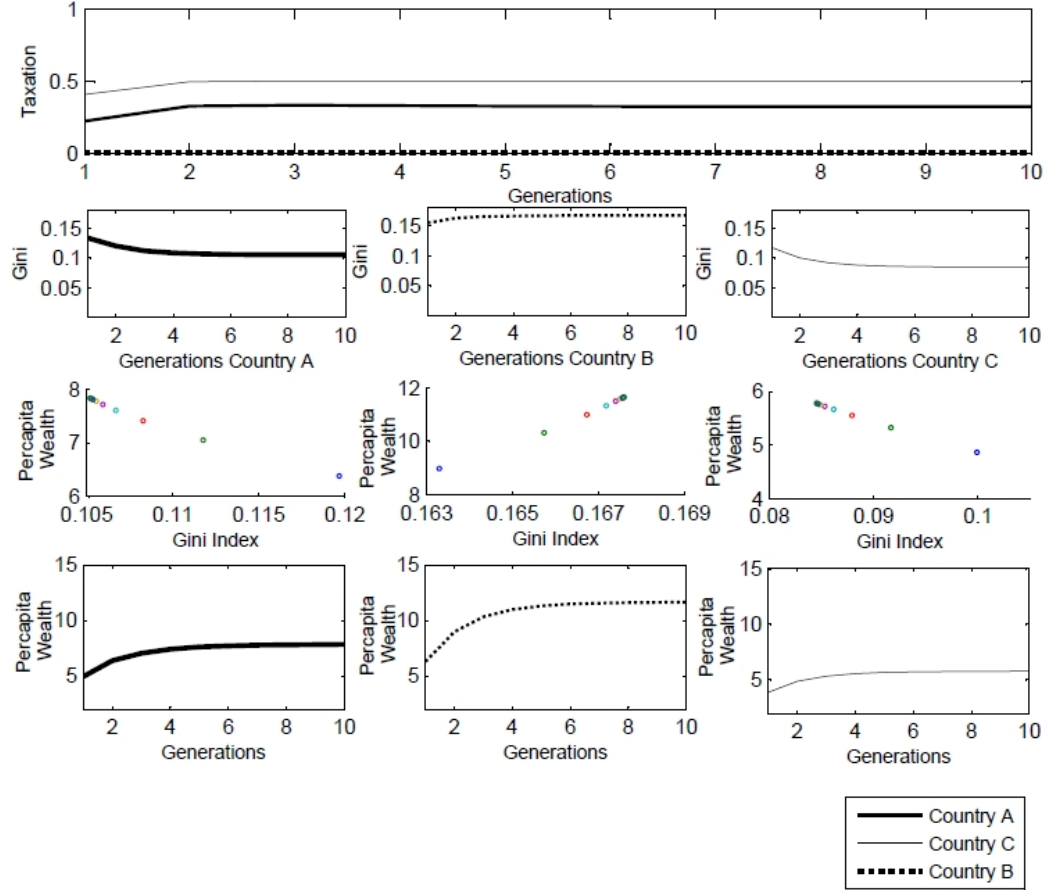


Figure 3.2: Different Ideologies

As in the figure, country B immediately starts with no redistribution (the tax rate always stays on the horizontal axis: $\tau_t^B = 0$, for all t ($= 1, 2, \dots$)), whereas countries A and C approach steady states with positive redistribution. The reason why the usual inequality-redistribution channel is not at work in country B is probabilistic party loyalty, along with the symmetric party bias among the citizens. However, positive taxation emerges also in the $\gamma = 0$ case as soon as we introduce asymmetric

policy bias. Thus the fact that in this experiment $\tau_t^B = 0$ is just a special case, but in any case country B would have lower taxes than countries A and C . In our example, country B will become persistently richer than country A , which in turn gets richer than country C . In this example, country A 's tax rate tends to 32.6%, while country C 's tax rate tends to 50.4%.

3.3.4 A POVERTY TRAP

By poverty trap we mean a situation in which a country does not manage to exit poverty because the policies induced by poverty itself are not growth enhancing: even if two countries have all the same parameters regarding intergenerational generosity α , importance of fairness γ , and the exact same distribution of innate abilities A_i , willingness to work β_i , and luck η_i ; they will take a long time to converge to the same steady state (figure 3.3a), or might even end up to two different steady states (3.3b). So, the only reason for these differences has to be found on the different levels of initial capital distribution k_{it} . In this case a country might be stuck in poverty, even if in theory it would have all the instruments to increase the level of per capita wealth.

Consider two economies sharing the same distribution of luck, willingness to work, and innate abilities, but different initial levels and distributions of capital and fair capital. Assume that one economy, A , starts from a low and unequal level of capital endowment; while the other, B , from a high and similarly unequal level of capital endowment, as shown in Figure 3.3a:

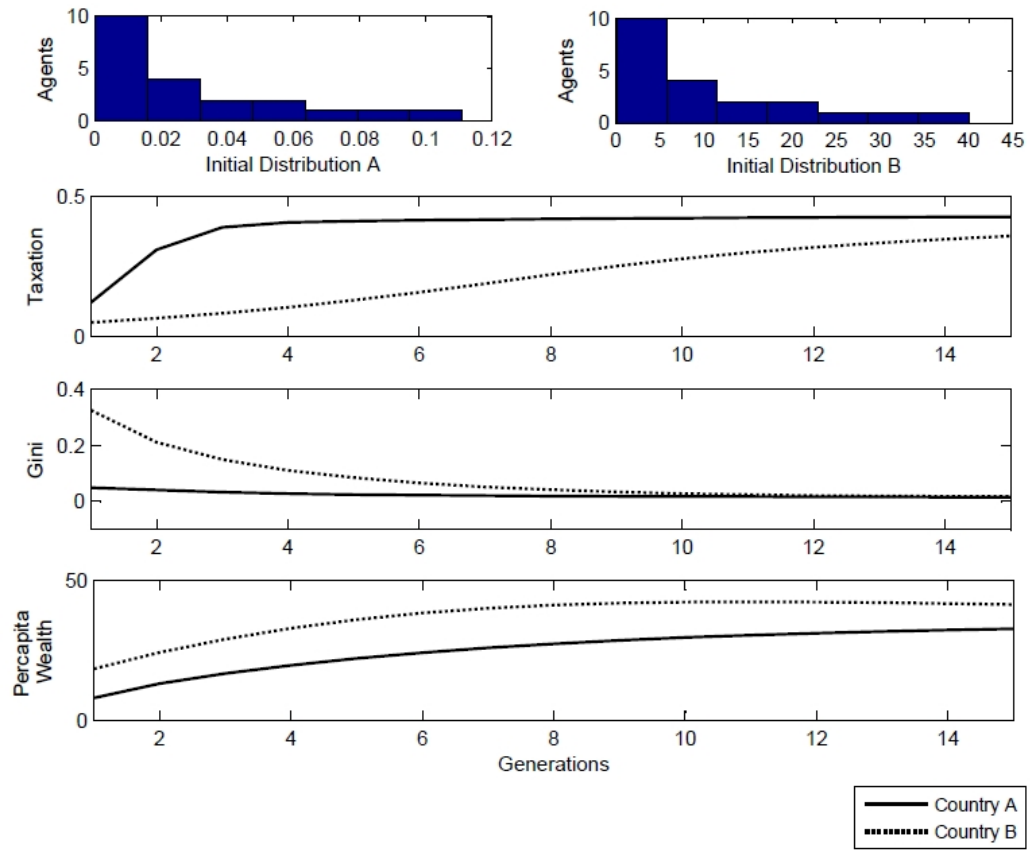


Figure 3.3a: Poverty Trap

In both countries the initial level of fair wealth is set equal to the actual initial wealth distribution. This example is representative of cases in which, when the country is poor, the luck component represents a larger share of realized wealth, and this induces the voters to prefer a high level of taxation. The poorer country starts with a higher redistribution, while the rich country simply increases redistribution at a lower pace. This in turn disincentivizes efforts and capital accumulation, thereby causing lower aggregate wealth accumulation. The country is cast for long into a poverty trap; with high taxes and low wealth.

Eventually, after some generations, in the previous figure, the poorer country starts slowly to accumulate more capital and to vote for reducing tax rates. Growth starts to increase and the poorer country tends to catch up with the other country's level of capital and taxation. The evolution of the concept of fairness plays a very important role also in this case. As the generations pass by, the individuals in the poorer country start to consider more and more fair the differences in the capital accumulation deriving from the abilities and the efforts. In this way taxation decreases and the capital accumulation can finally take off.

However, by slightly altering the parameters, we can provide examples in which the poverty trap is more extreme, as shown in Figure 3.3b below¹³:

¹³To generate this kind of examples, it suffices to slightly increase the value of γ and to slightly increase the dispersion of the luck distribution.

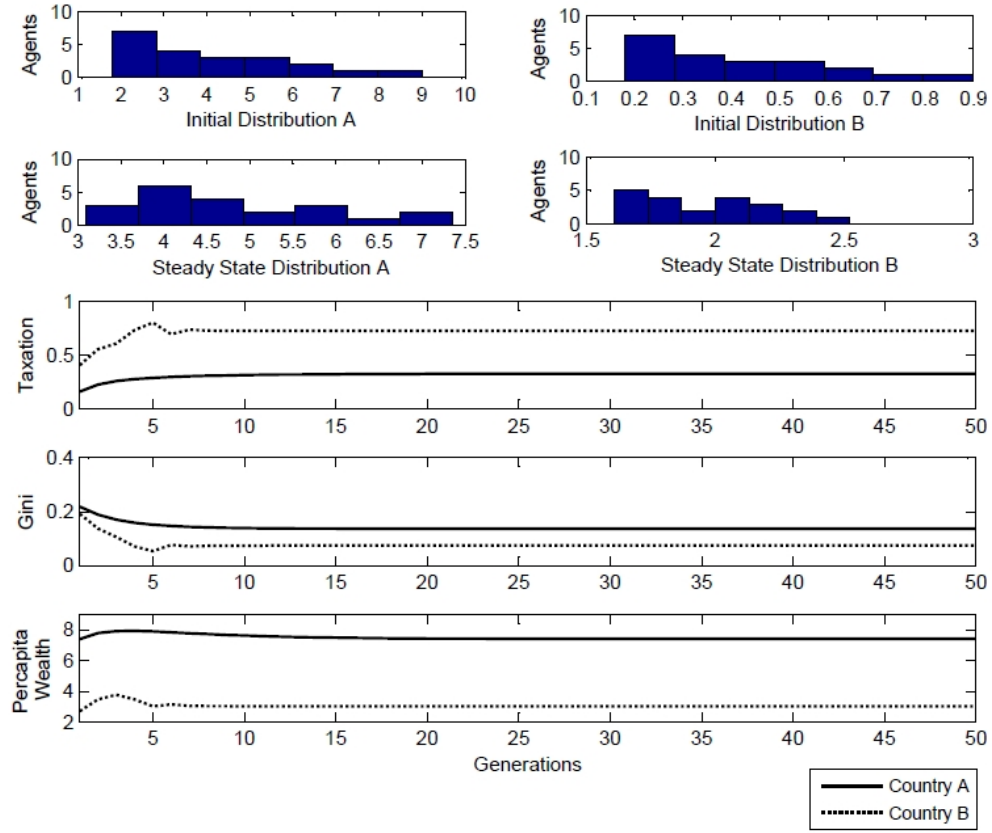


Figure 3.3b: Persistent Poverty Trap

In this example, we have assumed that country B starts ten times poorer than country A , while both countries believed their own initial wealth distribution to be fair (to avoid adding interfering ingredients). In country B , sheer poverty implies that a large part of people end-of-life wealth is due to luck, which causes the election of very highly redistributive policy platforms. Once in place, they will discourage individual efforts, thereby causing luck to play a central role in individual enrichment; this in turn reinforces the perception of unfairness in the wealth distribution, and corroborates drastically redistributive policies, thus perpetuating the poverty trap. Country B will never catch up with country A : it will rather converge to a different steady state wealth distribution, characterized by more poverty, more

taxation, and less inequality. It should be noted that very poor countries often do not have a well developed tax structure. Often in these countries redistributive policies take even more distorting forms often associated with corruption and in many cases ethnic politics. All the factors would make matters even worse and increase the chances of a poverty trap. Di Tella and Mc Culloch (2007) discuss reason why free market capitalist institutions may be fragile in developing countries precisely because the wealth inequality generated in those countries are (perhaps correctly so) perceived as generated by corruption and connections rather than abilities and effort.

3.3.5 DIFFERENT DEFINITIONS OF FAIR CAPITAL

We choose to define the fair level of capital as the capital that would have been reached if no luck nor government would have been present. This means that different levels of inheritance are tolerated if they derive from effort e_{it} , abilities A_i , or the willingness to work of the parent β_i , implying an intertemporal value judgment. However, at individual and government level only atemporal value judgment applies. Using the average level of the bequest \bar{k}_{it} would be an option, as for the average wealth the total effect of taxes and redistribution would be 0. The problem with this approach would be of inconsistency with the notion of fairness itself: it would not consider differences between wealth derived from luck η_i , effort e_{it} , abilities A_i nor willingness to work β_i . Therefore, individuals would simply be against any form of capital inequality, rather than unfairness.

The result is shown in figure 3.4, where we assume two identical countries A and B; the only difference between the two being in the definition of fair capital \hat{k}_{it} . In country A, represented by the solid line, the fair capital is defined as in our benchmark model:

$$\widehat{k}_{it} = \alpha \left\{ \delta_i(1 - \tau_t) + \widehat{k}_{it-1} \right\} \quad (3.12)$$

While in country B agents consider fair only the average capital inherited from the previous generation:

$$\widetilde{\widehat{k}}_t = \alpha \left\{ G_t + (1 - \tau_t) \int [\delta_j(1 - \tau_t) + \eta_j + k_{jt-1}] dj \right\}$$

The result is that country B has a higher level of redistribution and lower level of percapita wealth, while showing a lower level of inequality. Therefore, if the agents believe that, in every generation, the fair capital should be equal to the mean of the actual capital distribution, they will constantly vote for a higher level of tax rate, as they would consider every form of difference in bequest as unfair.

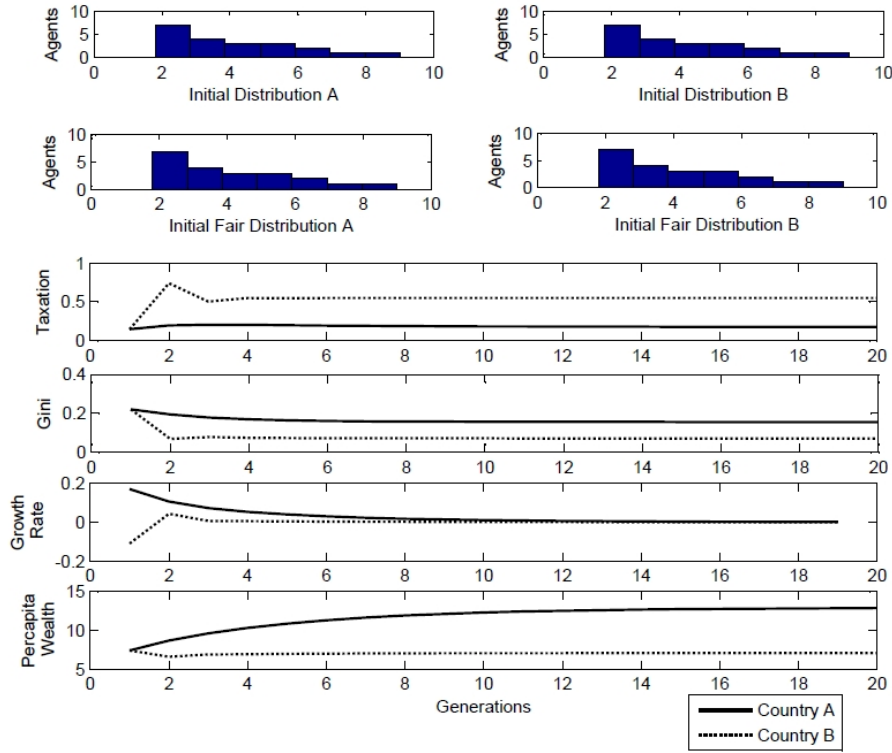


Figure 3.4: Different Definitions of Fair Capital

3.3.6 SHOCKS TO WEALTH DISTRIBUTION

3.3.5.1 SHOCKS WHICH EQUALIZE CAPITAL HOLDINGS

We can trace the effect of a shock in our stylized economy, by assuming that at some date - say, generation 4 - in country B - otherwise identical to country A - there is an unexpected shock that cuts all initial capital levels at a ceiling equal to 70% of the highest inherited capital level. We maintain the assumption of initial distribution viewed as fair. Figure 3.5 shows what would happen without the shock (country A) and with the shock (case B):

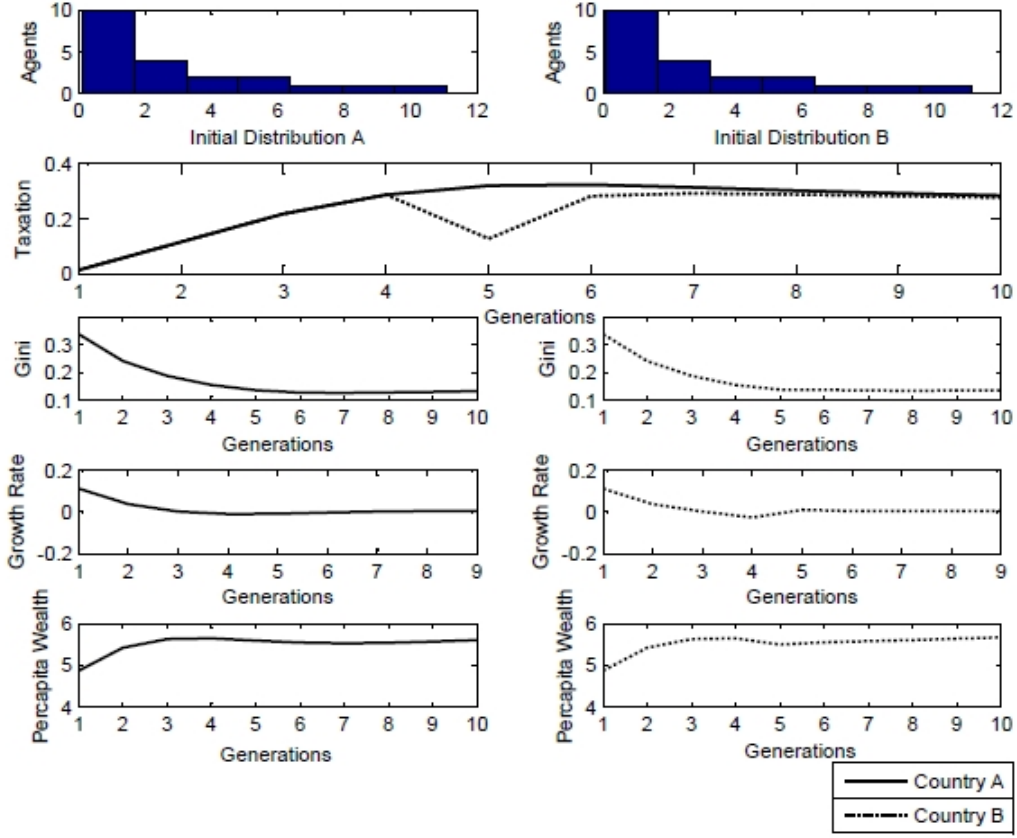


Figure 3.5: Shock on Capital

Since the shock is equalizing wealth levels, there is a temporary negative effect on the equilibrium tax rate due to the fairness motive. The reduction in redistribution implies only a relatively weak negative temporary effect on income and on inequality. The economy will re-absorb them completely within few generations.

3.3.5.2 SHOCKS WHICH EQUALIZE INDIVIDUALS' PRODUCTIVITIES

Suppose now that the top individual abilities are curtailed: in country B for one generation \tilde{t} (in the example of the figure $\tilde{t} = 4$) we have $\delta_{i\tilde{t}} = \min\{\delta_i, 0.60 \max_{j \in [0,1]} \delta_j\}$.

That is, we set a temporary ceiling for the abilities/stamina equal to 60% of their highest level in normal times. Lower abilities are left unchanged. In country A nothing happens. Figure 3.6 shows the effects:

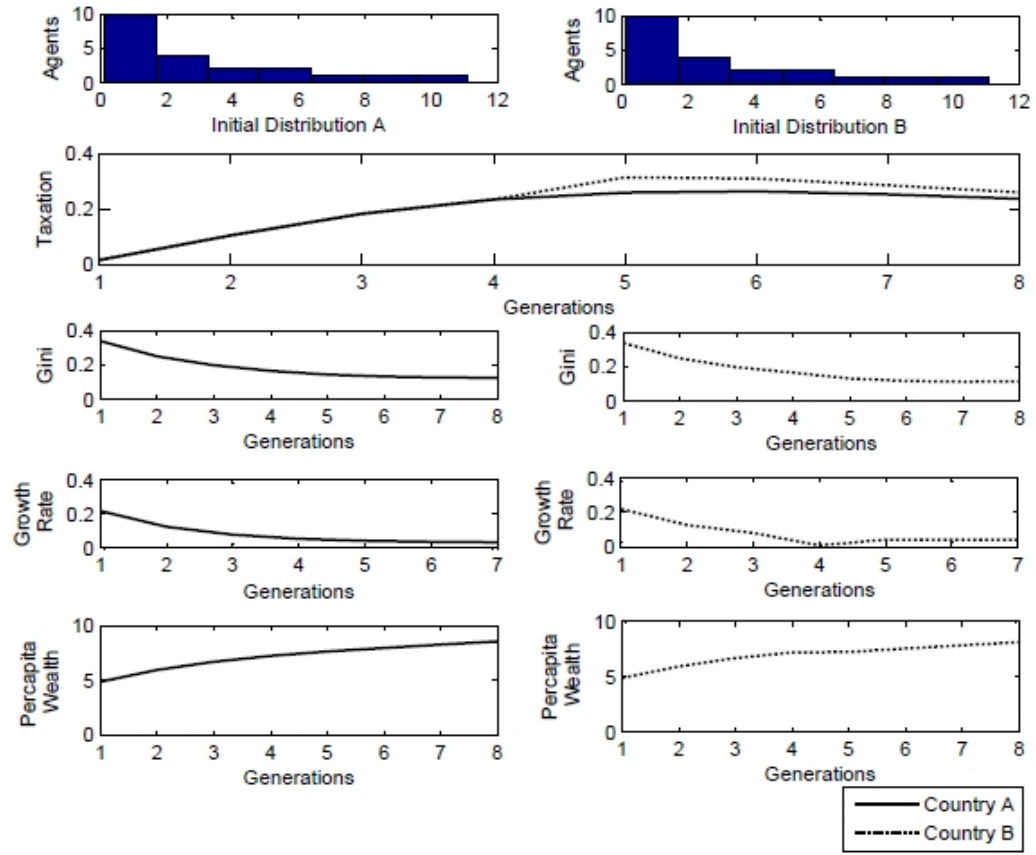


Figure 3.6: Shock on the Abilities

Because of the shock growth falls in *B*. Unlike in Figure 3.5, here the crisis is followed by an increase in redistribution: despite the crisis' equalizing power, country *B*'s voters choose more redistribution and higher tax rates. Why so? Fairness considerations tilt fiscal policy in favour of higher redistribution: if it is not creativity or

hard work that pays off the rich so much, then the relative importance of unjustified "luck" (which may include all sorts of non-work related sources of extra gains/losses) increases since top productivity level has gone down. Therefore, the perception of unfairness in the wealth increases, thereby inducing voters to increase redistribution and exacerbate the economic consequences of the crisis. As shown in the example illustrated by Figure 3.6, in the generation after the crisis (generation 5), country *A*'s tax rate is 26% while country *B*'s tax rate is 31.5%. Moreover, as the figure shows, these effects could be persistent, since higher tax rates introduce additional departures from fairness, to be corrected by the next generation, and so on.

One of the effects of the financial crisis of 2007-09 might have been to convince (rightly or wrongly) that much of the wealth built in the period leading up to the crisis were due to "luck" . The comparison of the financial market to "a Las Vegas casino", where, in fact, you win mostly by luck, were common. Our model would predict that despite the fact that the crisis itself might have reduced inequality, it would increase the political support for more redistribution precisely for a changed perception of what is "fair" wealth.

3.3.5.3 NON-PERSISTENT "LUCK"

If luck were not persistent, perhaps a negative shock on the most able individuals would not entail a higher than usual weight of luck in income and wealth. To check the robustness of these - along with other - result, we have run simulations by assuming that for every generation t the inter-family luck vector at birth, η_{it} , is independently drawn from a zero mean uniform distribution. This eliminates luck persistence completely, thereby allowing a substantial degree of upwards and downwards social mobility. Interestingly, all simulations we have performed reproduce

the regularity observed in the simpler deterministic case $\eta_{it} = \eta_i$: after the ability-equalizing shock, the winning tax rate is always higher than in the absence of the shock. A representative example is shown in the following Figure 3.6b:

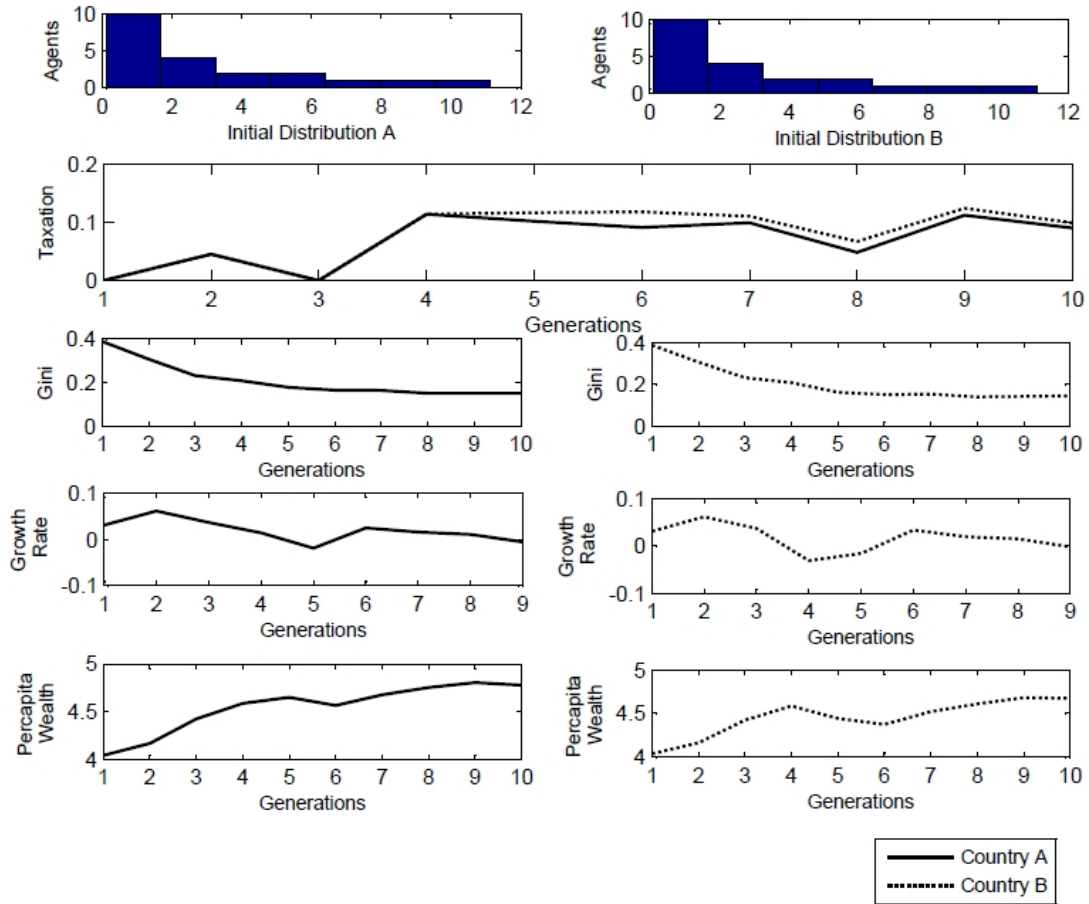


Figure 3.6b: Shock to the Abilities with Non Persistent Luck

The fact that "luck" is stochastic generates fluctuations. In our simulations, the realizations of random luck vector, η_{it} , generated is the same in both countries A and B , which explains why they are correlated; country B , represented by dashed

lines, is subjected to a one time ability ceiling (of 60% of the top ability, as in previous section 3.3.5.2) in period 4, whereas country A is not. In all cases we have tried, right after the negative shock on the top abilities, the country B voters are more inclined to redistribute than the voters of country A : the reason is that at the aggregate level, in the generation hit by the shock, luck matters relatively more than ability in explaining individual riches. Country B 's higher than usual taxation in one generation implies higher distortions (i.e. less effort and lower production), hence higher relative weights of luck, thereby inducing persistence in the propensity to vote for higher tax rates. Despite fluctuations led by changing luck distribution, the effects of a onetime ability-equalizing crisis take some time to be fully re-absorbed, with the two countries eventually converging to the same stochastic process.

If the parameters are such that multiple (stochastic) steady states can arise, the long term effect of a temporary financial crisis could be a persistent "soak the rich" effect, as shown in the following example:

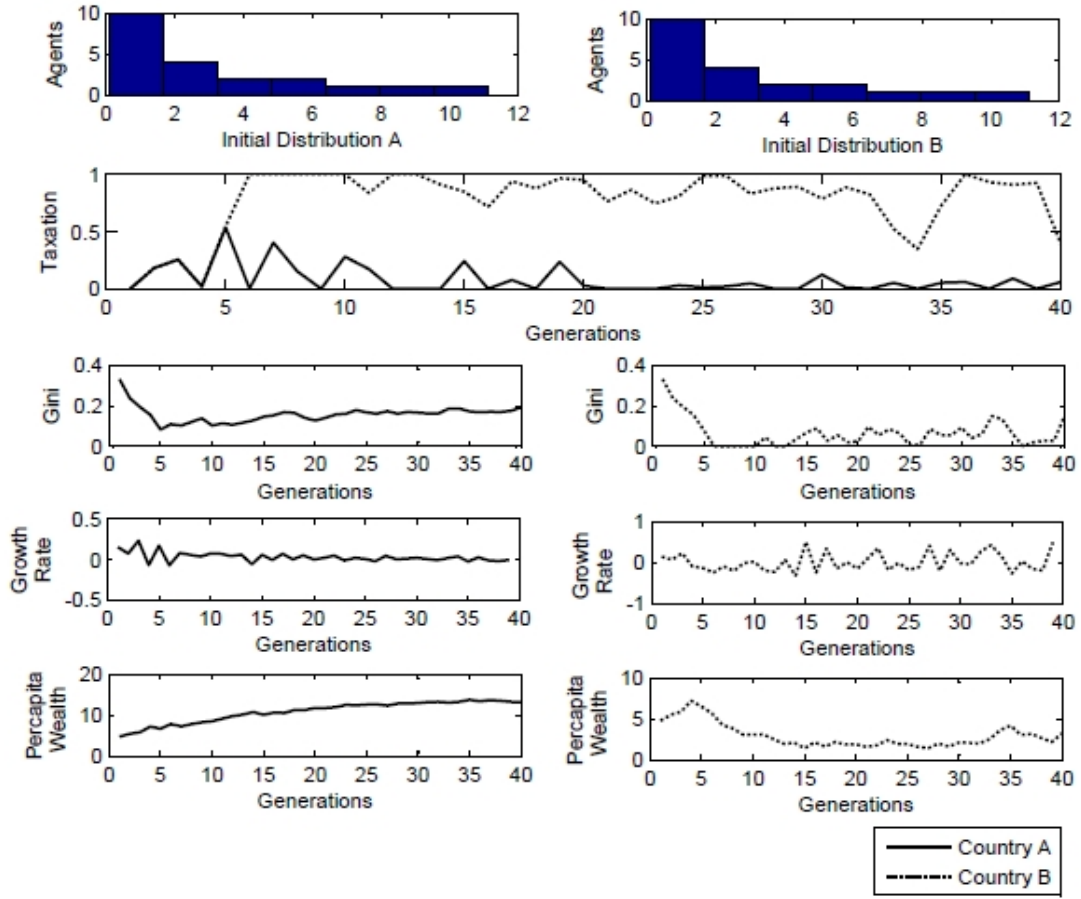


Figure 3.6c: Shock to the Abilities with non Persistent Luck 2

In Figure 3.6c, despite the same realization of the luck vector, the arrival in country *B* of a temporary negative shock to the top abilities triggers drastically different economic performances: while country *A* follows a trajectory characterized by very low taxation and very high per capita wealth, country *B* becomes characterized by the periodic choice of high tax rates, accompanied by lower per capita wealth, and with higher growth volatility than country *A*.

1.3.5.4 U-SHAPED TOP INCOME SHARES

In light of the previous sections, we could use our theory to provide additional explanations to the centennial U-shaped evolution of top income shares observed by Piketty and Saez (2003) and Atkinson, Piketty, and Saez (2010) in the US, in the other Western English speaking countries, and in non-Continental European countries. In fact, we could obtain the U-shape pattern by assuming that the top abilities first decrease and then increase after a number of periods. A representative example is shown in Figure 3.6d, where we depict in dashed line a country - B - that abandoned its steady state for a long sequence of periods in which the top abilities have been truncated, and then returns to its initial steady state.

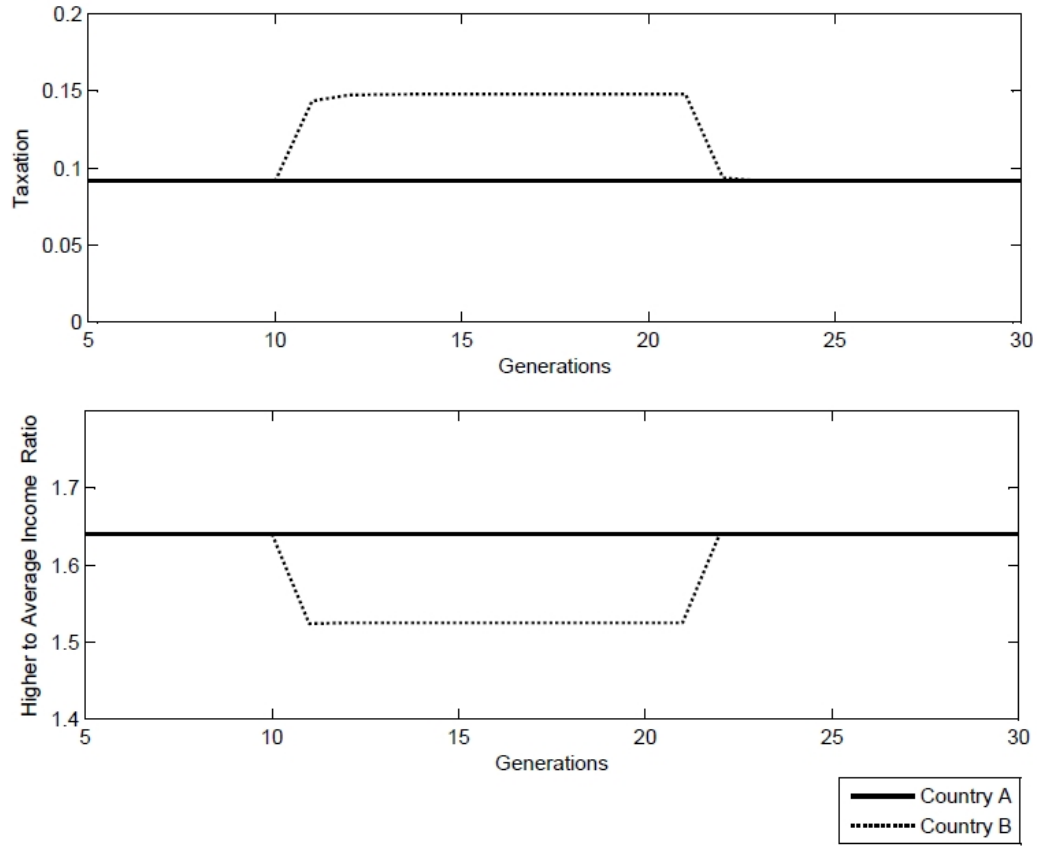


Figure 3.6d: U-Shaped Top Income Share

Not only this long-lasting negative shock to top abilities generates the U-shaped evolution of the before tax top income shares, but also generates the inverse changes in redistribution that accompanied it, as well as the evolution of ideology that marked the periods of change: first more and more in favour of redistribution, later more and more tolerant of inequality. According to our theory, the beginning of period exogenous decrease in the top abilities rendered their incomes more affected by luck as opposed to hard work, thereby justifying a stronger desire of redistribution; the end of period increase in top abilities would lead (even the poorer) voter into thinking that a larger part of the richest incomes is due to their productive contribution,

thereby deserved and less rightly redistributed. These shifts in top abilities generate fundamental changes as well as ideology and policy changes, that certainly reinforce the trends in the fundamental.

3.4 BEQUEST TAX

Our probabilistic voting structure allows multidimensional voting. Allowing for both inheritance taxes and income taxes, which in the previous sections were constrained to be the same, is interesting since with inheritance taxes one could much better target / remedy the effects of luck in past generations. The private utility function does not change but now bequest is taxed, and parents care about net bequests, hence:

$$k_{it} = (1 - \tau_{bt})b_{it}$$

The final life gross wealth is:

$$z_{it} = A_{it}e_{it} + \eta_{it} + k_{it-1}, \tag{3.13}$$

Let w_{it} denote final life post-tax and transfer wealth. Then the warm glow inter-generational altruism implies that fraction α of her end of life wealth is bequeathed, as seen by maximizing u_{it} subject to $c_{it} + b_{it} = w_{it}$. Therefore, plugging the optimal consumption and bequest into the private utility function, we obtain:

$$u_{it} = w_{it}(1 - \tau_{bt})^\alpha - \frac{e_{it}^2}{2\beta_{it}}, \tag{3.14}$$

and hence:

$$k_{it} = (1 - \tau_{bt})\alpha w_{it}.$$

As before, fiscal policy platforms are voted by each generation before exerting their effort choices. Income tax rate, τ_{yt} , is proportionally applied to end of life incomes. All tax revenues are to be redistributed lump sum to all individuals. Hence

$$w_{it} = (1 - \tau_{yt})(A_{it}e_{it} + \eta_{it}) + k_{it-1} + G_t. \quad (3.15)$$

Government budget is always balanced, and after rearranging can be written as:

$$G_t = \frac{[\tau_{yt} + \tau_{bt}\alpha(1 - \tau_{yt})] \int_0^1 A_{jt}e_{jt}dj + \tau_{bt}\alpha \int_0^1 k_{jt-1}dj}{1 - \tau_{bt}\alpha}.$$

Notice that, consistently with the simple structure of our stylized model, we have assumed that bequest taxes are redistributed within the bequest donors group, which might seem bizarre at first sight. However, somewhat paradoxically, this is much more realistic than assuming that inheritances are all redistributed at the beginning of life. In fact, assuming that inheritance taxes are redistributed within the immediate inheritance recipient group would be stretching the model's simplification too far, in particular the working assumption that all individuals die at the same date: it would bias the conclusion of our model in the direction of a too high equilibrium bequest tax rate.

Since taxation is known at the beginning of life, before the effort choice is taken, maximizing u_{it} , using (3.14), (3.13), and (3.15), gives optimal effort choice:

$$e_{it} = (1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{it} \beta_{it},$$

which shows that individual effort will be discouraged by expected taxation, and is increasing in the individual work ability and decreasing in the disutility of effort.

Hence equilibrium lump sum transfers are:

$$G_t = \frac{1}{1 - \tau_{bt}\alpha} \left\{ \int_0^1 [\tau_{yt} + \tau_{bt}\alpha(1 - \tau_{yt})] \delta_{jt}(1 - \tau_{yt})(1 - \tau_b)^\alpha dj + \tau_{bt}\alpha \int_0^1 k_{jt-1} dj \right\}.$$

Consequently, the reduced form private utility is:

$$u_{it} = [(1 - \tau_{yt})((1 - \tau_{yt})(1 - \tau_{bt})^\alpha \delta_{it} + \eta_{it}) + k_{it-1} + G_t] (1 - \tau_{bt})^\alpha - \frac{(1 - \tau_{yt})^2 (1 - \tau_{bt})^{2\alpha} \delta_{it}}{2}. \quad (3.16)$$

As before, we posit that in individuals tolerate inequality coming from innate ability and effort, but are averse to inequality coming from everything else, luck and taxation. As mentioned before, each individual chooses $k_{it} = \alpha w_{it}$, where α represents the generosity towards the next generation.

The generation t individual i utility, U_{it} , after fairness considerations are included and before including the political party bias, is:

$$\hat{U}_{it}(\tau_{yt}, \tau_{bt}) = u_{it} - \gamma \Omega_t, \quad (3.17)$$

where

$$\begin{aligned}\Omega_t &= \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj = \int_0^1 [w_{jt}(1 - \tau_{bt})^\alpha - \hat{w}_{jt}]^2 dj = \\ &\int_0^1 \left[\begin{aligned} &[(1 - \tau_{yt})((1 - \tau_{yt})(1 - \tau_{bt})^\alpha \delta_{jt} + \eta_{jt}) + k_{jt-1} + G_t] (1 - \tau_{bt})^\alpha \\ &- [(1 - \tau_{yt})(1 - \tau_{bt})^\alpha \delta_{jt} + \hat{k}_{jt-1}] \end{aligned} \right]^2 dj \end{aligned} \quad (3.18)$$

and $\gamma > 0$ is the parameter which measures the importance of unfairness for society. The complete utility function would then be:

$$\hat{U}_{it}(\tau_{yt}, \tau_{bt}) + \sigma_{it} + \varepsilon_t,$$

with same interpretation of the party identification idiosyncratic and aggregate shocks σ_{it} and ε_t . Using (τ_{yt}, τ_{bt}) instead of τ_y in the same steps as in Lemma 3.1, the reader can straightforwardly verify the following:

Lemma 3.3. *In pairwise majority voting, there will exist a unique equilibrium in which the two parties will select the same policy variables, $(\tau_{yt}^*, \tau_{bt}^*)^L = (\tau_{yt}^*, \tau_{bt}^*)^R \equiv (\tau_{yt}^*, \tau_{bt}^*)$, given by*

$$(\tau_{yt}^*, \tau_{bt}^*) = \arg \max_{(\tau_{yt}, \tau_{bt}) \in [0,1]^2} \int_0^1 \varphi_i \hat{U}_{it}(\tau_{yt}, \tau_{bt}) di. \quad (3.19)$$

In the case of perfectly symmetric political bias, the resulting probabilistic voting equilibrium will maximize the utilitarian welfare functional, that is

$$(\tau_{yt}^*, \tau_{bt}^*) = \arg \max_{(\tau_{yt}, \tau_{bt}) \in [0,1]^2} \int_0^1 \hat{U}_{it}(\tau_{yt}, \tau_{bt}) di. \quad (3.20)$$

Since now the voters have a larger tax menu, *they* will achieve higher welfare than if they can vote on only an income tax or only on a bequest tax.

3.4.1 DISCUSSION

Given that the utility of consumption is a Cobb-Douglas:

$$u_{it} = \frac{1}{(1-\alpha)^{1-\alpha}\alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha - \frac{1}{2\beta_i} c_{it}^2,$$

and that individuals can vote on both bequest and income; if individuals were to vote on the private utility only, than the optimal bequest tax would be 0. The reason is to be found in Atkinson and Stiglitz's uniform commodity taxation theorem (1976), which states that if utility is weakly separable between consumption and leisure, then it is optimal to tax all the goods at the same rate. In fact, a bequest tax violates the theorem, and implies a non-uniform commodity tax, because, as Atkinson and Stiglitz (1976) proved, future consumption (equivalent to capital) is more heavily taxed than present consumption.

However, as it will be possible to see in the next subsection, in our model we obtain a positive bequest tax. The reason is to be found entirely in the aversion to unfairness component 3.18: if individuals believe that the distribution of bequest is unfair, because not all the wealth of the parent derives from work, abilities, or willingness to work, they will vote for a positive bequest tax. Agents want to tax unfair bequest as well as unfair income, and thus tend to impose positive taxation on both.

Therefore, having a measure of unfairness in our welfare functional allows us to obtain an innovative result compared to the existing literature, by violating the uniform commodity theorem.

3.4.2 NUMERICAL EXAMPLES: DYNAMIC EVOLUTION

As in the previous sections, we can run simulations of the different scenarios in the presence of multidimensional policy, and track the evolution of ideology, fiscal policy, and macroeconomic variables in the presence of bequest taxes. Figure 3.6 shows a representative case, in which we have set symmetric policy identification, under three different assumptions about ideological preferences: distaste for unfairness - country A; distaste for inequality *per se*, that is:

$$\Omega_t^C = \text{var}(w_{it}), \quad (3.21)$$

in country B. This is the multidimensional equivalent to the exercise of Figure 3.2, when voters can vote for both an income tax rate and a bequest tax rate. If people believe that inherited wealth, no matter how generated, should be heavily taxed to equalize everybody at birth this would imply a very high level bequest taxes. This of course could have implications on savings, capital accumulation, and the amount of bequest, and the structure provided by this variant of the model seems ideal to study this set of issues. Simulations show that, contrary to this intuition, the presence of a bequest tax as different from an income tax would not lead to an egalitarian society for the same reasons why a wealth tax did not: being individuals different, the fair end of life wealth distribution would entail some inequality, and this would be transmitted over the generations. This is shown in Figure 3.7 country A simulations.

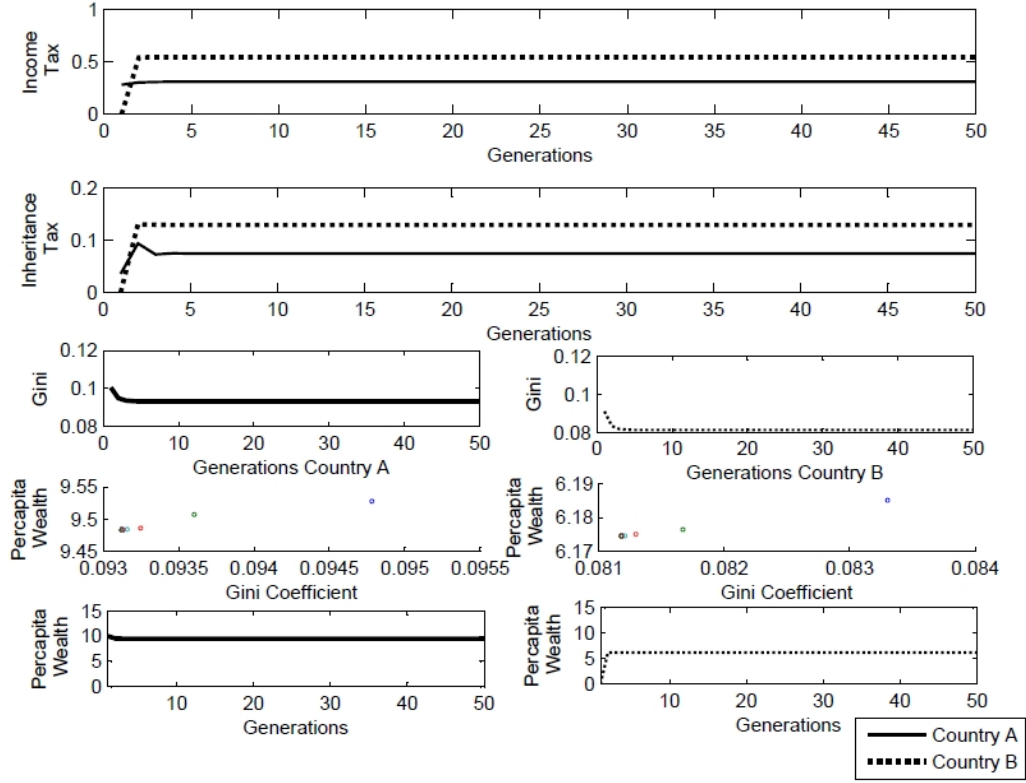


Figure 3.7: Different Ideas of Fairness with Bequest Tax

It is worthwhile noting that Figure 3.7's country B, shows that even in a society that only cared about inequality *per se*, bequests would not be taxed too highly. In fact, since parents care about the net inheritance received by their children, they would not want to penalize them too much by voting for taking all of it away. It is important to note that in the stylized model we proposed, children's inheritances get taxed without the children being immediately and automatically redistributed lump-sum all the inheritance tax proceeds: this is only partially obtained, while most of the tax proceeds actually go to fund current fiscal policy, and therefore become available income to the whole population who are deciding how to split their wealth between consumption and bequest. This is crucial for the realism of our model,

because in the real world inheritance tax proceeds would actually accrue to all tax payers, regardless of their being the small fraction of per-year inheritance recipients.

Consistently with what has been shown in the unidimensional voting case of Figure 3.2, Figure 3.7 shows that introducing the bequest tax as a policy measure in two countries that differ only in their preferences on the wealth distribution leads to a dynamic equilibrium in which both tax rates are higher in the country in which voters dislike inequality *per se* than in the country that dislikes unfairness.

In summary the critical points regarding bequest taxes are two. Their introducing does not imply that income taxes would never be used. Second bequest taxes would not be set at the level that (accounting for disincentive effects) would maximize redistribution from bouquets. This is because part of wealth left for bequest is viewed as "fair" thus fairness concerns work against taxation of inheritance. Thus our results generalize to the case of bequest taxation. Income taxes and bequests taxes in our simulations are positively correlated.¹⁴

3.5 CONCLUSIONS

In this chapter, we have shown how the evolution of the political ideology regarding the fairness of the constellation of income and wealth in society can generate economic and political persistence in inequality, redistribution, and growth. According to our simple framework, ideology does not entail information nor cognitive distortions of reality, but it shapes the moral judgement on what wealth distribution would be fair, as well as it internalizes into people's preferences how strongly the distance between the current wealth distribution and the fair one makes people

¹⁴The correlation between the revenues as percentage of GDP of income and profit tax and inheritance and gift tax on 25 OECD countries is 0.48. For an extensive analysis of tax systems in industrialized countries see Messere (1998).

unhappy. Our model is consistent with a variety of observations about the relationship between inequality, redistribution, and persistence of poverty which could not be explained with more standard models of redistributive policies.

As we have seen, there are several possible extensions to our basic framework. Probably the most interesting one was to extend the policy set of tax and transfer schemes. Two particularly relevant ones come to mind, namely endogenous abilities and inheritance taxation. This model with its emphasis on fairness seems ideal to address issues of social justice like equalizing initial conditions versus redistribution. Equalizing the initial condition can be achieved in two ways: through high public schooling and inheritance taxation. In Chapter 6 we analyse economies where government can use tax revenues to provide public good and public education, while in Chapter 5 we study the possibility of an inheritance tax and an income tax, calculated through the use of a tax differential.

APPENDIX

Lemma 3.1. *In pairwise majority voting, there will exist a unique equilibrium in which the two parties will select the same policy variable, $\tau_t^L = \tau_t^R \equiv \tau_t^*$, given by:*

$$\tau_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di. \quad (3.22)$$

Proof. In fact, individual i of generation t will vote for party R if $\hat{U}_{it}(\tau_t^R) > \hat{U}_{it}(\tau_t^L) + \sigma_{it} + \varepsilon_t$, that is if $\sigma_{it} < \hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t$. Given our assumption on σ_{it} , this event happens with probability $\left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t \right] \varphi_i + \frac{1}{2}$. Aggregating over all individuals and using the law of large numbers, the fraction of votes that goes to party R is: $\pi_R = \int_0^1 \left\{ \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t \right] \varphi_i + \frac{1}{2} \right\} di =$

$\int_0^1 [\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L)] \varphi_i di - \varphi \varepsilon_t + \frac{1}{2}$, where $\varphi \equiv \int_0^1 \varphi_i di$ is the average of the individual ideological densities. Party R wins if $\pi_R > \frac{1}{2}$, which happens if and only if $\varepsilon_t < \frac{\int_0^1 [\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L)] \varphi_i di}{\varphi}$. From our assumptions on ε_t , this happens with probability $\left(\frac{\int_0^1 [\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L)] \varphi_i di}{\varphi} - \left[-\frac{1}{2\psi} \right] \right) \psi = \psi \frac{\int_0^1 [\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L)] \varphi_i di}{\varphi} + \frac{1}{2} \equiv p_R$. Party R therefore chooses $\tau_t^* = \arg \max p_R = \arg \max_{\tau_t^R} \int_0^1 \hat{U}_{it}(\tau_t^R) \varphi_i di$. Swapping notations, party L chooses $\tau_t^* = \arg \max p_L = \arg \max_{\tau_t^L} \int_0^1 \hat{U}_{it}(\tau_t^L) \varphi_i di$. By Weierstrass theorem a maximum certainly exists. Moreover, it is generically unique. Q.E.D.

Lemma 3.2. *Let us assume that the distribution of abilities and luck are such that $\inf \{A_i^2 \beta_i : i \in [0, 1]\} > -\inf \{\eta_i : i \in [0, 1]\}$. Then $w_{it} \geq 0$ for all $i \in [0, 1]$, and $t = 1, 2, \dots$, for every non-negative initial capital vector k_{i0} , $i \in [0, 1]$, and for every tax rate sequence $\tau_t \in [0, 1]$.*

Proof. First notice that the above stated condition implies:

$$\int_0^1 A_j^2 \beta_j dj > -\inf \{\eta_i : i \in [0, 1]\} \equiv |\eta^{\inf}|. \quad (3.23)$$

Let us consider the worst possible scenario, in which $k_{it-1} = 0$ for all $i \in [0, 1]$: if we are able to prove that $k_{it} = \alpha w_{it} \geq 0$ in this case, then $k_{it} \geq 0$ will hold in all other cases.

From the definition of end-of-life post-tax wealth, optimal effort choice, and government transfer, it easily follows that:

$$w_{it} = (1 - \tau_t) z_{it} + G_t = (1 - \tau_t)^2 A_i^2 \beta_i + (1 - \tau_t) \eta_i + \tau_t (1 - \tau_t) \int_0^1 A_j^2 \beta_j dj, \quad (3.24)$$

which expresses w_{it} as a quadratic function of τ_t . Hence, $w_{it} = 0$ if and only if $\tau_t = 1$ and:

$$\tau_t = -\frac{\eta_i + A_i^2\beta_i}{\int_0^1 A_j^2\beta_j dj - A_i^2\beta_i}. \quad (3.25)$$

Let us first focus on the $\tau_t = 1$ root. Since in $\tau_t = 1$, $w_{it} = 0$, as τ_t becomes lower than 1, we need to make sure that w_{it} does not immediately become negative: that is we want w_{it} to be locally a decreasing function of τ_t . Taking the derivative of w_{it} with respect to τ_t we get:

$$\frac{dw_{it}}{d\tau_t} = -2(1 - \tau_t)A_i^2\beta_i - \eta_i + (1 - \tau_t) \int_0^1 A_j^2\beta_j dj - \tau_t \int_0^1 A_j^2\beta_j dj < 0 \quad (3.26)$$

if and only if:

$$\eta_i > -2(1 - \tau_t)A_i^2\beta_i + (1 - 2\tau_t) \int_0^1 A_j^2\beta_j dj. \quad (3.27)$$

Notice that if $\tau_t = 1$ inequality (3.27) holds true if:

$$\eta_i > - \int_0^1 A_j^2\beta_j dj, \quad (3.28)$$

holds, which is a consequence of inequality (3.23). Clearly, this guarantees only that $w_{it} > 0$ for τ_t slightly less than 1.

Setting $\tau_t = 0$ in (3.24), it becomes:

$$w_{it} = A_i^2\beta_i + \eta_i, \quad (3.29)$$

which is positive if $A_i^2\beta_i > -\eta_i$, which holds under the condition in the statement. Hence, being wealth (3.24) quadratic in τ_t , the second root of $w_{it} = 0$ - given by eq. (3.25) - has to be negative if the corresponding parabola is concave or larger than 1 if it is convex¹⁵. In both cases, $w_{it} > 0$ for all $\tau_t \in [0, 1]$. QED

¹⁵Simple graphing shows that any parabola $y = ax^2 + bx + c$ sloping down at $x = 1$ and positive at $x = 0$, will be positive for all $0 \leq x < 1$.

CHAPTER 4

IDEOLOGY AND PUBLIC EDUCATION

4.1 INTRODUCTION

This chapter explores the connection between ideology and public education. It shows how the idea of fairness and the preferences for public schooling interact with each other and with wealth inequality, and, secondly, how this influences future abilities, the future per capita wealth distribution, and economic growth.

It analyses, for the first time to our knowledge, the connection between the idea of fairness and the preferences for public schooling. The main innovation, compared to the existing literature, is that we study how ideology, and in particular ideas of fairness, through influencing preferences for redistribution, can create long lasting effects on public education, and therefore on the abilities of individuals. This aspect of ideology has not been explored yet, even if there are empirical suggestion that ideology might influence education (see Alesina and Glaeser 2004). In this chapter we will provide an extensive analysis of the interactions between ideology and inequality in determining public schooling, and how public schooling, by affecting the general level of abilities, and therefore of future income, influence voting and ideology with a novel feedback mechanism, which, at least to our knowledge, has never been explored. We observe the voting behavior of individuals whose preferences for redistribution and public education depend on their ideas about what is fair as well as the economic variables in the society.

Thus, this chapter presents a model in which individuals care about their personal wealth, which is allocated between bequest for the subsequent generation and consumption, as well as about the public expenditure, which is allocated by the government between education and the public good. In an extension of the model we also insert transfers. As in the benchmark model in Chapter 3, the ideology, and in particular the idea of fairness, helps to shape the preferences of the individuals.

The main goal of this chapter is to explore how ideology affects public schooling and, by using a feedback mechanism, how public schooling influences ideology. There are two main issues to be considered. First, we study how different initial ideas and definitions of fairness affect voting and therefore the decisions about public schooling, both with wealth tax and with income and bequest tax. Second, we analyse how differences in the initial level of education affect ideology and voting.

This chapter continues from Chapter 3, which analyses the whole transition of the dynamic model of Alesina and Angeletos (2005a). Given the complex structure of the model, it is hard to fully characterize the dynamic transition of this model analytically. Therefore, we develop and use a general algorithm that allows simulating numerically the dynamic version of the model, and starts from any distribution of actual and fair wealth of the initial generation. We compute the whole dynamic transition, with the sequence of redistributive policies that win the electoral game and the associated public education and actual and fair wealth distribution of every generation.

In Chapter 3 we introduced a probabilistic voting framework in order to rely on more robust equilibria, and provided simulations for several cases that we consider also here. This chapter compares the intergenerational equilibrium time series deriving from different initial conditions. It analyses how different ideas and definitions of fairness affect the equilibria and the dynamic transitions deriving from democratic elections. We also provide an extension of the model where individuals

vote on the allocation of the tax revenues between the transfers, the public good and the education.

The chapter is organized as follows. Section 4.2 presents the model. Section 4.3 analyses data from the World Values Survey and the European Values Survey. Section 4.4 analyses different ideas of fairness. Section 4.5 differentiates between income tax and bequest tax. Section 4.6 introduces an extension of the model with transfers. Section 4.8, finally, presents the conclusions. The Matlab codes are available from the author upon request.

4.2 PUBLIC EDUCATION, WEALTH TAX, AND REDISTRIBUTION

The framework used here is similar to Chapter 3. We assume a society composed of successive generations t of individuals, each living for one period, with each individual indexed by $i \in [0, 1]$. The total mass of individuals is normalized to 1. There is only one active individual per family, and she is characterized by a certain degree of innate abilities $r_i > 0$, endurance to work $\beta_i > 0$, and luck η_i which is i.i.d. between the individuals, with $\int_0^1 \eta_j dj = 0$. β_i and η_i are both invariant over time. Each individual inherits capital from her parent $k_{it-1} \geq 0$ and receives public education $h_{t-1} \geq 0$, which helps to define her abilities.

Individuals maximize the private utility u_{it} that derives from the private wealth and public spending. The utility depends positively on consumption c_{it} , bequest k_{it} , and the government expenditure G_t . The private utility also depends negatively on effort e_{it} . Therefore, the warm glow intergenerational altruism translates in the capital that each individual leaves to her child, and is represented by the parameter $\alpha \in (0, 1)$:

$$u_{it} = \frac{c_{it}^{1-\alpha} k_{it}^\alpha}{(1-\alpha)^{1-\alpha} \alpha^\alpha} + BG_t^\phi - \frac{1}{2\beta_{it}} e_{it}^2, \quad (4.1)$$

individuals do not value government expenditure as much as their own private wealth, therefore the parameter that represents the marginal utility of public expenditure is positive, but smaller than 1: $\phi \in (0, 1)$. The government expenditure is also multiplied to a constant $B \geq 1$, as individuals still want a positive public expenditure. The utility is maximized under a private budget constrain, as the consumption and the capital left to the child cannot exceed the after tax wealth:

$$w_{it} = k_{it} + c_{it}$$

Where the after tax end of life wealth w_{it} depends on abilities, effort, luck, capital inherited from the previous generation, and lump sum tax:

$$w_{it} = (A_{it}e_{it} + \eta_i + k_{it-1})(1 - \tau_t). \quad (4.2)$$

The optimal amounts of capital and fairness are represented by a proportion of the end of life net wealth:

$$k_{it} = \alpha w_{it} \quad c_{it} = (1 - \alpha) w_{it}$$

The government maximizes the impact of the public expenditure, which depends positively on the public good g_t and on the public schooling h_t :

$$G_t = \frac{h_t^\omega g_t^{1-\omega}}{\omega^\omega (1-\omega)^{1-\omega}}$$

The parameter $\omega \in (0, 1)$ represents the importance of the future generations for the state. The public good is consumed equally by the individuals, while public schooling increases the abilities of the subsequent generation. The abilities, for each individual, are partially innate and perfectly inherited from the parent¹ $r_i > 0$; and partially dependent on the public schooling implemented by the previous generation²:

$$A_{it} = r_i + h_{t-1}$$

There is no possibility for public debt, therefore the expenditure for the public good and public education cannot exceed the tax revenues for each generation:

$$h_t + g_t = \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj$$

The tax revenues do not include luck, as it brings no productive contribution on average.

The optimal public resource allocation is:

$$h_t = \omega \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj \quad , \quad \text{and} \quad g_t = (1 - \omega) \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj$$

Plugging in 4.1 the optimal values of capital, consumption, transfers, and public schooling, the utility becomes:

¹Assuming abilities extracted from a random distribution in each generation does not change our qualitative results.

²Using a function for the abilities in which the level of learning from the public school depends on the innate abilities would complicate the computation but not add to the qualitative analysis.

$$u_{it} = (1 - \tau_t) (A_{it}e_{it} + \eta_i + k_{it-1}) + B \left(\tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj \right)^\phi - \frac{e_{it}^2}{2\beta_i}$$

The optimal effort, which is discouraged by taxation, is:

$$e_{it} = (1 - \tau_t) A_{it} \beta_i, \quad (4.3)$$

4.2.1 FAIRNESS AND EQUILIBRIUM

As in Chapter 3, the utility also depends on the distance between the actual variables and the variables individuals consider fair. The total utility U_{it} is composed of the private utility u_{it} and the disutility of living in an unfair society Ω_t :

$$U_{it} = u_{it} - \gamma \Omega_t$$

Where γ is a country specific parameter that represents the importance of distaste for unfairness. The disutility of living in an unfair society is defined as the distance between the actual private utility and the private utility which is considered fair by each individual:

$$\Omega_t = \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj \quad (4.4)$$

The definition of fairness follows Alesina and Angeletos (2005a). Individuals do not tolerate inequality when it does not come from effort, willingness to work and

abilities. Namely, they consider wealth unfair if it is generated from luck or public expenditure. The utility considered fair by the individuals therefore differs from the actual utility because of the absence of public expenditure:

$$\widehat{u}_{it} = \widehat{w}_{it} - \frac{e_{it}^2}{2\beta_i} \quad (4.5)$$

At the same time, the end of life wealth does not incorporate luck and does not include taxes

$$\widehat{w}_{it} = A_{it}e_{it} + \widehat{k}_{it-1} = (1 - \tau_t)A_{it}^2\beta_i + \widehat{k}_{it-1} \quad (4.6)$$

The effort is always considered fair, and is diminished by taxation. Therefore, the idea of fairness is shaped by the taxation decided by the previous generation, and individuals learn from the actual decisions of the society. The idea of fairness depends also on the idea of fairness inherited from the parent. In fact, every parent transmits to her child her idea of fairness. The optimal fair capital and fair consumption are:

$$\widehat{k}_{it} = \alpha \widehat{w}_{it} = \alpha \left[(1 - \tau_t)A_{it}^2\beta_i + \widehat{k}_{it-1} \right] \quad (4.7)$$

$$\widehat{c}_{it} = (1 - \alpha) \widehat{w}_{it} = (1 - \alpha) \left[(1 - \tau_t)A_{it}^2\beta_i + \widehat{k}_{it-1} \right] \quad (4.8)$$

After some simple substitutions it is possible to define the total utility U_{it} for each individual

$$\begin{aligned}
U_{it} &= [A_{it}^2 \beta_i (1 - \tau_t) + \eta_i + k_{it-1}] (1 - \tau_t) \\
&+ B \left(\tau_t \int_0^1 [A_{jt}^2 \beta_j (1 - \tau_t) \tau_t + \tau_t k_{jt-1}] dj \right)^\phi - (1 - \tau_t)^2 \frac{A_{it}^2 \beta_i}{2} \\
&- \gamma \int_0^1 \left[\frac{(A_{jt}^2 \beta_j (1 - \tau_t) + \eta_j + k_{jt-1})(1 - \tau_t)}{+ B \left(\int_0^1 (A_{jt}^2 \beta_j (1 - \tau_t) \tau_t + \tau_t k_{jt-1}) dj \right)^\phi - A_{jt}^2 \beta_j (1 - \tau_t) - \widehat{k}_{jt-1}} \right]^2 dj \\
&\equiv \widehat{U}_{it}(\tau_t).
\end{aligned} \tag{4.9}$$

4.2.2 VOTING AND TIMING

As in Chapter 3 we use a probabilistic voting framework. We assume there are two political parties L and R which commit simultaneously to a tax rate τ_t . Individuals vote for a party at the beginning of their life, after observing their luck, innate abilities, education, capital, and willingness to work. Parties L and R have a certain degree of popularity. In fact, every individual identifies with one party or the other. The complete utility function includes the aggregate popularity and the individual popularity of the parties L and R

$$\tilde{U}_{itP} = u_{it} - \gamma \Omega_t + (\sigma_{it} + \varepsilon_t) \chi_L(P), \text{ where } P = L, R.$$

χ_L is a dummy variable which takes value 0 if the party is R, and 1 if the party is L³. Therefore σ_{it} , which can be positive or negative, represents the individual popularity of party L, and ε_t the aggregate popularity of party L. Both σ_{it} and ε_t are uniformly distributed, with mean 0, respectively on supports $\left[-\frac{1}{2\varphi_i}, \frac{1}{2\varphi_i}\right]$ and

³The opposite also would work.

$\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$. The support of the individual popularity is larger than the support of the aggregate popularity:

$$\left[-\frac{1}{2\varphi_i}, \frac{1}{2\varphi_i}\right] > \left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right] \quad \psi > \varphi_i$$

Therefore, single individuals can have more extreme preferences for one party or the other, while the aggregate society tends to be more moderate. Parties L and R commit to the policy platform before knowing the aggregate and individual popularity, and maximize the probability of being elected.

Lemma 4.1. *In pairwise majority voting a unique equilibrium exists in which parties L and R select the same policy variable, $\tau_t^L = \tau_t^R \equiv \tau_t^*$, given by*

$$\tau_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di. \quad (4.10)$$

Which is the same equilibrium policy variable that would be chosen by a biased social planner who maximizes a weighted aggregate welfare functional:

$$W(\tau) \equiv \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di,$$

The proof of Lemma 4.1 is the same of Lemma 3.1.

After voting, individuals decide how much effort to provide. The elected party fully commits to the announced policy and implements the taxation, transfers and public education for the next generation at the end of individuals' life. Finally, individuals decide how to allocate consumption and bequest.

The link between different generations is represented by the transmission of actual capital, fair capital, and education:

$$A_{it} = h_{t-1} + r_i = \omega \tau_{t-1} \int_0^1 [A_{jt-1}^2 \beta_j (1 - \tau_{t-1}) \tau_{t-1} + \tau_{t-1} k_{jt-1}] dj + r_i$$

and

$$k_{it} = \alpha(1 - \tau_t) (A_{it}^2 \beta_i (1 - \tau_t) + \eta_t + k_{it-1})$$

while:

$$\widehat{k}_{it} = \alpha A_{it}^2 \beta_i (1 - \tau_t) + \alpha \widehat{k}_{it-1}$$

After the decisions about the allocation of capital, consumption and public education, the model is iterated.

4.2.3 DISCUSSION

In building the model we assume that education affects the productivity of the subsequent generation by increasing abilities A_{it} , and, at the same time, we assume that education enters in the utility of the parents as a form of public good :

$$G_t = \frac{h_t^\omega g_t^{1-\omega}}{\omega^\omega (1 - \omega)^{1-\omega}} \quad (4.11)$$

Therefore, the government also care about the future generation, and its abilities, and does it in measure $\omega \in (0, 1)$. However, alternative modelling strategies are

possible. Schooling could not affect future abilities, or could not enter in the utility function of the present generation. Let's consider the implication of both cases, starting with the possibility that public schooling does not affect future abilities.

In this case the utility function and the constraint would not change, because the utility function would be atemporal. The main difference compared to the actual model would be in the intergenerational abilities link, which in this case would become:

$$A_{it} = r_i$$

Therefore, all the wealth invested in schooling would be lost. Nevertheless, individuals would vote only according to their utility function, and the government would still maximize the government spending allocation as in 4.11, as they would systematically not be able to foresee that public education does not enhance future abilities. Compared to our benchmark model, the election results would be the same, however, the percapita wealth would be consistently lower given the lower abilities.

The second case to explore is the one in which public education does not enter in individuals utility function, but still enhances future abilities. In this case the main difference would be in the government spending allocation, as all the government spending would be used to produce the consumption public good:

$$G_t = g_t$$

Therefore this case, would be the opposite of the previous one, but have similar consequences: even if public education will have an impact on future generations' abilities, agents are not able to foresee that, and therefore the government will

systematically invest no wealth in public education. Given that the parameter ω would be equal to 0, the intergenerational abilities link would be once again:

$$A_{it} = r_i$$

From an efficiency point of view this case could be preferred to the first one because no resources would be wasted. These two examples show how, in order to obtain public education to have an effect on future wealth, it is necessary that public education both influences future abilities, and enters in the utility function.

Another strong assumption that we make in this chapter is the complete absence of private education. The reason for this choice is to keep the focus on the relation between ideology and education, allowing the government to maximize the public expenditure impact, and in section 4.7, individuals to decide how to allocate public spending between transfers, and public good/public education. If parents could choose to use their private wealth to provide a different education for their children (i.e. private education), they would face a decision between public schooling and private schooling. The consequences of the assumption that only public education is available are that every agent will receive the same level of education, without the possibility of differences, no matter the wealth of the parent, her preferences, or the personal characteristic of the child. This implies our definition of schooling to be really simple, and probably unsuitable to describe the subject of education in its full. However, in order to study the interactions between public education and ideology, inserting private education would not qualitatively add much, and would severely complicate the notation.

4.3 THE CONNECTION BETWEEN THE IDEA OF FAIRNESS AND PUBLIC EDUCATION

The first issue that needs to be explored is if there is a relation between the ideology and the idea of fairness in societies. In the European Values Review (2008), individuals replied to the question v-67⁴: "Why people are in need?". The possible choices were: 1) Unlucky, 2) Laziness or Lack of Willpower, 3) Injustice in Society, 4) Part of Modern Progress, 5) None. While answer 1,3, and 4 do not consider being poor as a failure of the person herself, answer 2 implies that if someone is poor she is to blame for it.

If this idea would reflect the true situation of equal opportunities in societies one should expect that the more people answer 2, the more the equal the opportunities are. However, Alesina and Glaeser (2004) proved this is not the case.

In this chapter we analyse specifically if changes in the idea of fairness influences the public expenditure for education. We consider the intersection of European Union and the European countries part of the European Values Survey.

In Figure 4.1, we plot the data about the percentage of people who believe that if someone is poor it is because she is lazy or lacks willpower, and the data about the Expenditure for Public Education as percentage of GDP in the year 2008 taken from the World Bank data⁵, and insert a simple linear fitting⁶:

⁴The complete data and metadata for the European Values survey can be found at <http://zacat.gesis.org/webview/index.jsp>

⁵Data regarding the public education expenditure as a percentage of GDP were taken from <http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS>

⁶This is just a visualization of the connection between public expenditure in education and beliefs about fairness, and it is not meant to be an econometric analysis.

For substantial econometric analysis about the role of ideology in determining the public expenditure see: Alesina and Glaeser (2004), Alesina and La Ferrara (2005), Alesina and Giuliano (2010).

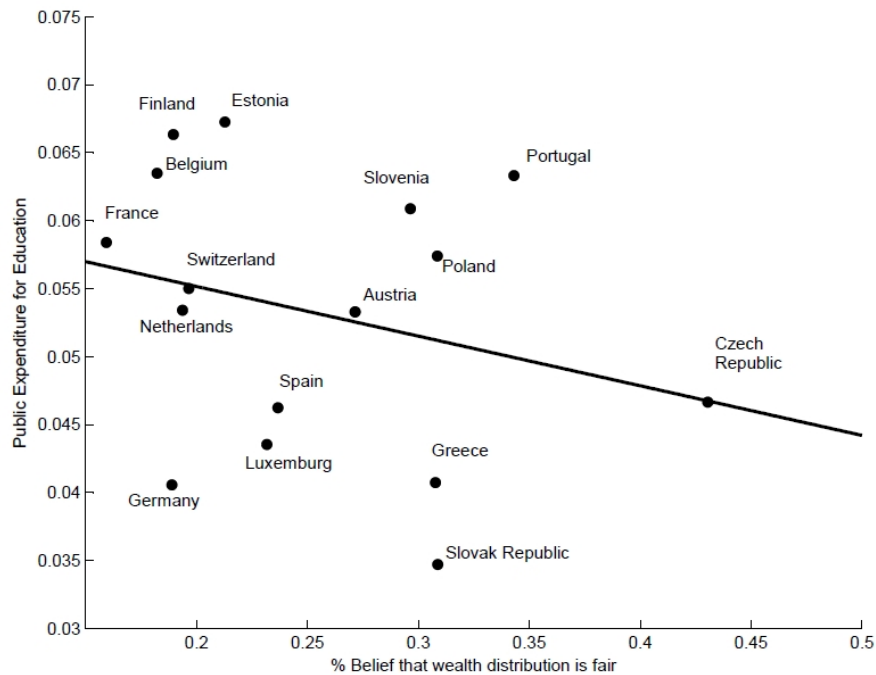


Figure 4.1: Public Education and Belief Wealth Distribution is Fair

It can be seen that, for these countries, the more individuals believe that poor people deserve to be poor, the lower the expenditure for public education is. The correlation between the percentage of individuals who believe that people in need are lazy or lack willpower and the public expenditure for education is -0.267. Could this be a European anomaly?

Let's consider other countries. In the World Values Survey, for the wave 1994-1999, individuals replied to the question "Why do people live in need?". In this case individuals could decide between: 1) Poor Because of Laziness and Lack of Will Power, 2) Poor Because of an Unfair Society, 3) Other Answer. The correlation between the percentage of individuals who replied 1) and the public expenditure for education is -0.254. The correlation between the percentage of individuals who replied 2) and the public expenditure for education is 0.179. Figure 4.2 shows the

scatter plot of the countries studied by the World Values Survey and inserts a linear fitting. Since the year of the survey varies from country to country from 1994 and 1999, we used for each of them the Public Expenditure on Education for the exact year.

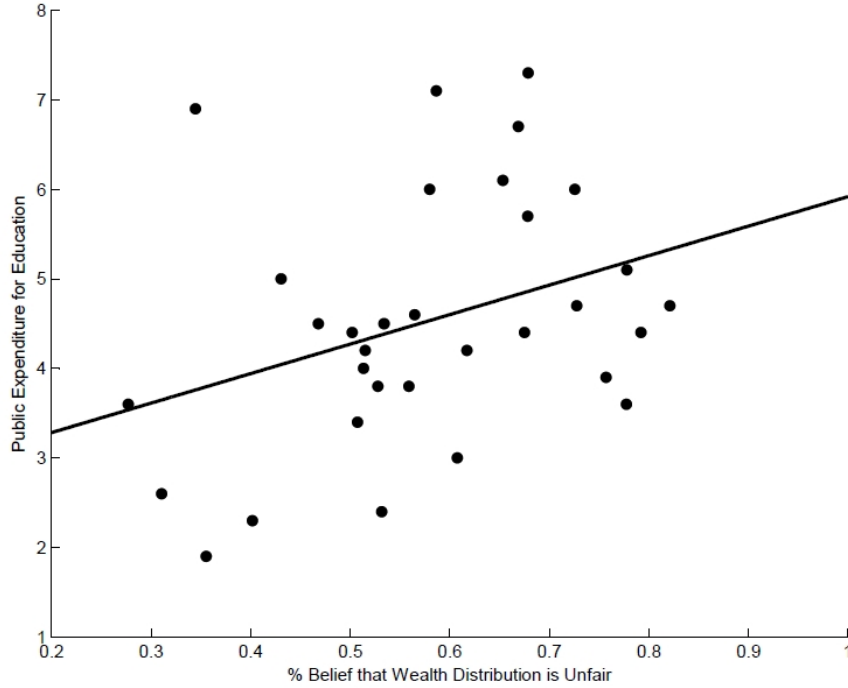


Figure 4.2: Public Education and Belief Wealth Distribution is Unfair

Does the model presented in Section 4.2 fit the data derived from the World Values Survey and the European Values Survey? Using a program written in Matlab code, the model is simulated and reiterated for 100 generations, converging to the steady state. This process is repeated for different levels of importance for fairness in the society, namely varying the parameter γ . In Figure 4.3, it is possible to see that plotting the different values of γ and the Public Expenditure for Education in the steady state we obtain a positive relation. This means that the more unfairness

is important for a society, the higher public education. At same time, the lower the importance of unfairness for a society, the lower public expenditure for education.

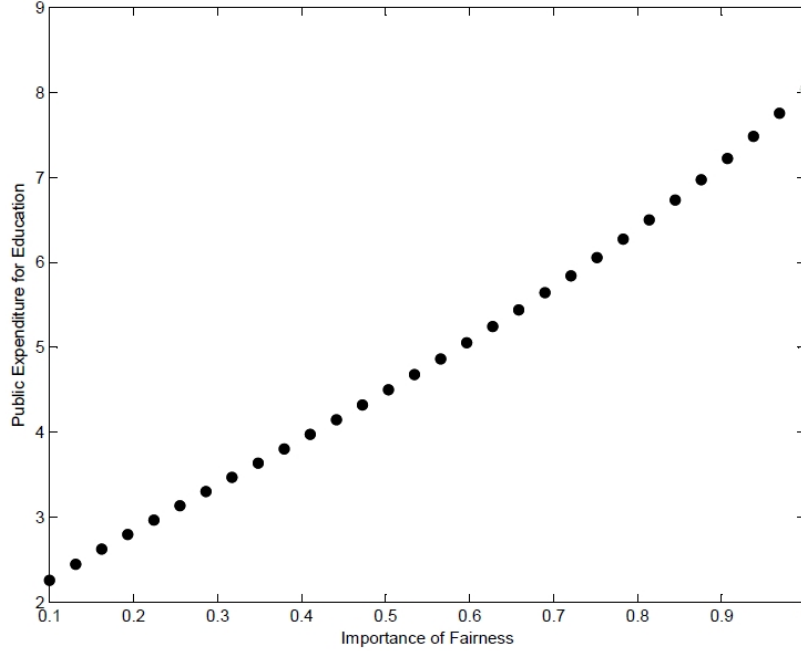


Figure 4.3: Public Education and Importance of Unfairness

4.4 EFFECT OF IDEOLOGY ON PUBLIC EDUCATION

Starting from distributions of capital k_{it-1} and fair capital \hat{k}_{it-1} and defining parameters relative to personal and country specific characteristics, it is possible to study some specific scenarios and analyse how the model behaves in response to them. The analysis focuses on how ideology affects voting, and, together with wealth inequality, shapes the economic outcomes of elections. We analyse different ideologies and different initial ideas of fairness. For each scenario, the whole transition is studied and completely showed.

4.4.1 DIFFERENT IDEOLOGY

As in Chapter 3, we focus on what happens if two countries have different ideologies. The question is: does ideology really matter for public education? The answer is shown in Figure 4.4 and Figure 4.5. In Figure 4.4, two countries are analysed: Country A is the benchmark case, while in Country B individuals do not care about fairness, namely in their utility function $\gamma = 0$. For both countries we show the initial distribution of capital and whole transitions of the tax rate τ_t , per capita abilities $\int_0^1 A_{jt} dj$, per capita gross wealth $\int_0^1 (A_{jt} e_{jt} + k_{jt-1}) dj$ and Gini coefficient.

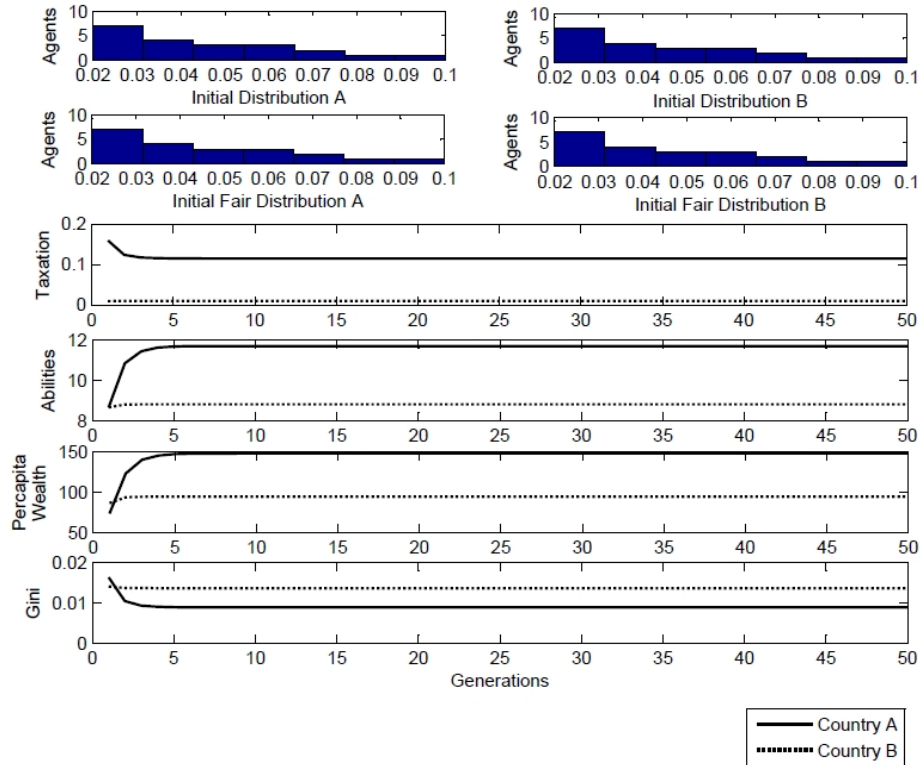


Figure 4.4: Different Ideologies

Differently from Chapter 3 even if individuals do not care about fairness, they still want a positive public expenditure and therefore both Country A and Country

B implement a positive taxation. However, the two countries converge to two different steady states. Country A implements a higher level of taxation, which brings about higher public expenditure for education, higher per capita income and a lower Gini coefficient, performing overall better compared to Country B. In this case the disincentive effect of the taxation on the effort is overpowered by the positive effect regarding the increase of the abilities.

We also consider different definitions of fairness: in Figure 4.5 it is possible to see the comparison between our benchmark case, represented by Country A in which the measure of unfairness is represented by the distance between the utility and the utility considered fair:

$$\Omega_t = \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj$$

And Country B, in which individuals are against wealth inequality *per se*, and therefore the measure of unfairness is represented by the variance of wealth:

$$\Omega_t = var(w_{it})$$

Individuals who are intolerant to inequality *per se* constantly vote for a higher taxation with consequences on abilities, income, and Gini coefficient:

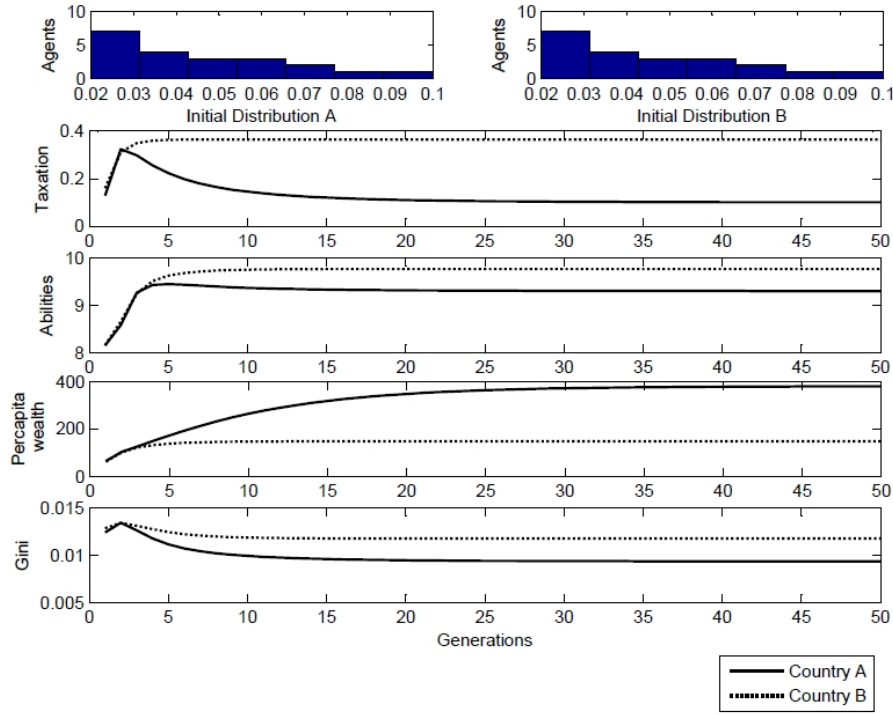


Figure 4.5: Different Definitions of Fairness

The higher taxation of Country B brings about higher public expenditure and therefore higher abilities compared to Country A. However the taxation is so high that its discouraging effect on taxation prevails on the higher abilities. Therefore, Country B has lower per capita income than Country A. The lower income means that individuals do not accumulate enough capital, and the wealth distribution reflects the differences in luck, bringing about a higher Gini coefficient.

4.4.2 DIFFERENT INITIAL IDEAS OF FAIRNESS

Voting and abilities are not affected solely by the ideology in a country, but also by the initial idea of fairness, which can affect public education for generations. Suppose there are two countries, Country A and Country B, identical in every aspect but the

initial distribution of the capital considered fair. This means that the difference between the two stands only in how the first generation pictures a fair society. First generation individuals in Country A believe that the actual capital distribution is fair, while the first generation individuals in Country B believe that the distribution of capital would be fair only if every individual would have inherited the exact same wealth.

As in Chapter 3, the scenario of Country B can picture a society in which there is a sudden shock that changes the ideology, like the 60ths in Europe and US.

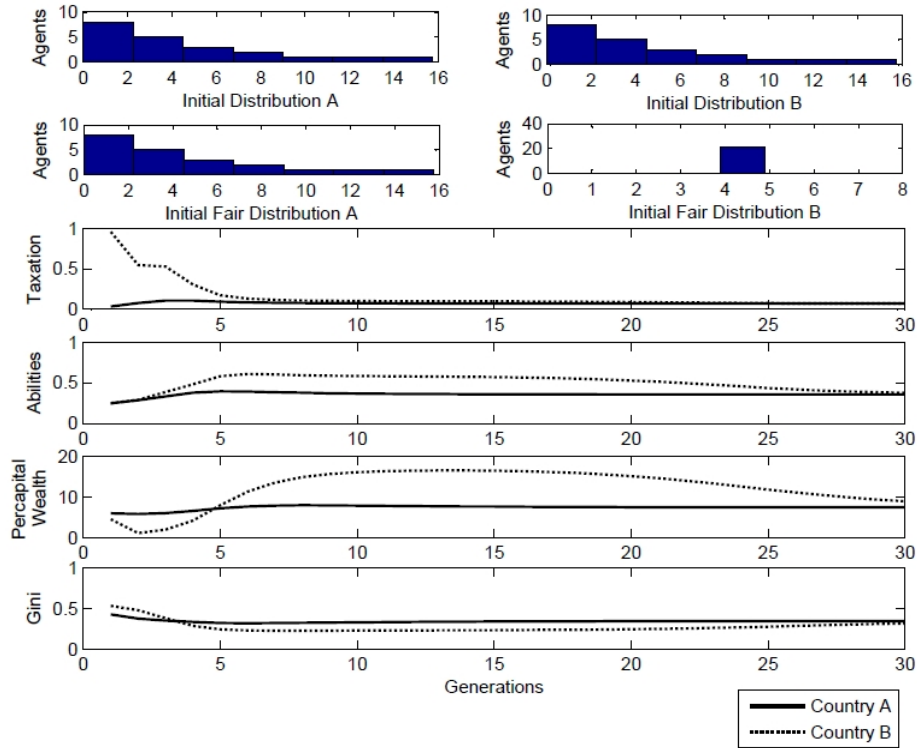


Figure 4.6: Different Initial Ideas of Fairness

Country A starts with a low taxation and low expenditure for public schooling. Individuals produce high effort and therefore their per capita income is higher than the one of the individuals in Country B. In fact, individuals in Country B are so

convinced by their ideology in the first generation that decides to vote for a very high tax rate, impairing effort.

In the first periods the abilities in the two countries are the same, since even if Country B imposes higher taxes, effort is so much discouraged that the tax revenues are relatively small. Moreover the Gini coefficient is higher than in Country A as it reflects the uneven distribution of luck.

As generations go by, their idea of fairness changes, the taxation in Country B decreases, and the revenues increase, leading to high abilities. The higher abilities combined with the higher effort bring about a dramatic increase in the per capita income and a decrease in the Gini coefficient, leading to better equilibria compared to Country A for more than 25 generations. After that the two countries slowly converge.

While in Chapter 3 higher taxation decreased the productivity, and therefore the per capita income; here fiscal policy can be used to increase, in the long run, the productivity and the income.

4.4.3 DIFFERENT INITIAL PUBLIC EDUCATION

We analyse what happens when two countries start with different initial levels of public education. We assume that the first generation of Country A (represented by the continuous line) receives double education compared to the individuals who populate Country B (represented by the dotted line).

As a result, country A implements lower taxation for generations. The individuals in Country A have higher abilities, higher per capita income and there is lower Gini coefficient in the country compared to Country B.

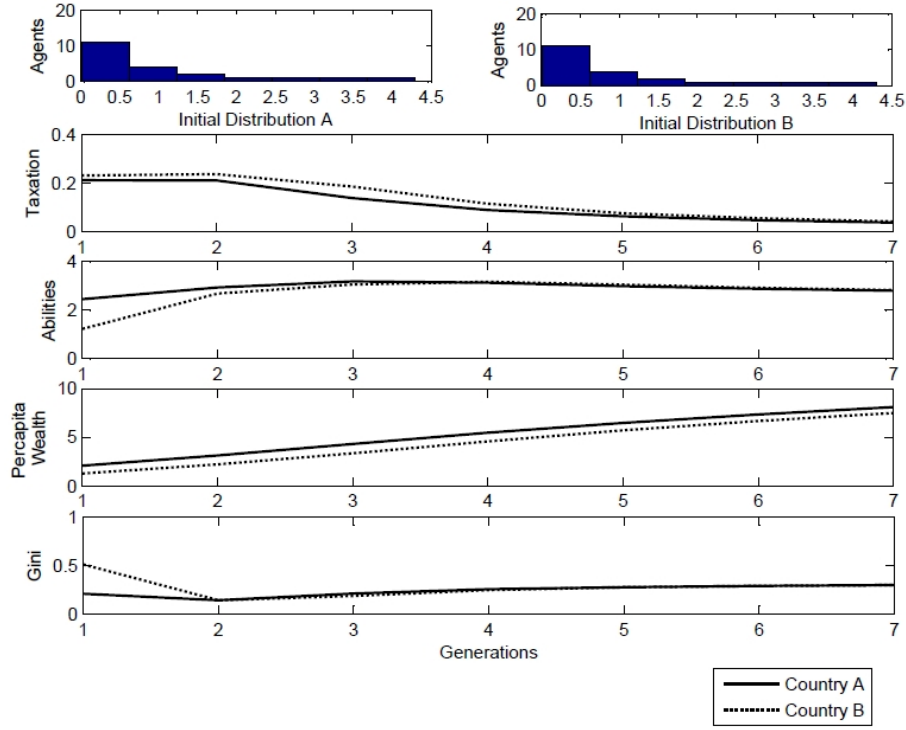


Figure 4.7: Different Initial Public Education

The effect of a difference in the expenditure for public education lasts for generations, affecting not only the productivity, but also the future decisions about taxation. However, the two countries eventually converge.

Up to now we considered only one policy instrument: a wealth tax. In the next section we differentiate, as in Chapter 3, between income tax and bequest tax.

4.5 PUBLIC EDUCATION WITH INCOME TAX AND BEQUEST TAX

In this section we investigate if differentiating the wealth tax between income tax and bequest tax impacts the model's numerical result. The utility function takes the same form as in the benchmark model 4.1.

$$u_{it} = \frac{c_{it}^{1-\alpha} k_{it}^\alpha}{(1-\alpha)^{1-\alpha} \alpha^\alpha} + BG^\phi - \frac{1}{2\beta_{it}} e_{it}^2, \quad (4.12)$$

However, this time personal budget constraint is different:

$$w_{it} = b_{it} + c_{it}$$

Where the variable b_{it} represents the gross bequest. The after tax end of life wealth is given by the wealth minus the income tax τ_{yt} :

$$w_{it} = (1 - \tau_{yt})(A_{it}e_{it} + \eta_i) + k_{it-1}$$

And the net bequest:

$$k_{it} = (1 - \tau_{bt})b_{it}$$

where τ_{bt} is the tax imposed on the bequest. The parents therefore care about the net wealth that they are leaving to their children along with the education that will enhance their ability to earn. So in this case we move from the pure warm-glowing altruism towards the interest of parents for the "ability of their children to receiving income" (Grossman and Poutvaara, 2008).

The optimal values of k_{it} and c_{it} are:

$$k_{it} = \alpha(1 - \tau_{bt})w_{it} \quad (4.13)$$

$$c_{it} = (1 - \alpha)w_{it} \quad (4.14)$$

The government's objective function is the same as in the model with wealth tax:

$$G_t = \left(\frac{h_t^\omega g_t^{1-\omega}}{\omega^\omega (1-\omega)^{1-\omega}} \right)$$

And it is maximized under the public budget constraint:

$$h_t + g_t = \tau_{yt} \int_0^1 (A_{jt} e_{jt}) dj + \tau_{bt} \int_0^1 b_{jt} dj$$

The optimal values of h_t and g_t are:

$$h_t = \omega \left(\tau_{yt} \int_0^1 (A_{jt} e_{jt}) dj + \tau_{bt} \int_0^1 b_{jt} dj \right), \quad \text{and} \quad (4.15)$$

$$g_t = (1-\omega) \left(\tau_{yt} \int_0^1 A_{jt} e_{jt} dj + \tau_{bt} \int_0^1 b_{jt} dj \right) \quad (4.16)$$

The utility, once we plug the optimal values of the choice variables 4.13, 4.14, 4.15, and 4.16 in the private utility function 4.12, becomes:

$$\begin{aligned} u_{it} = & (1 - \tau_{bt})^\alpha ((1 - \tau_{yt})(A_{it} e_{it} + \eta_i) + k_{it-1}) \\ & + B \left(\tau_{yt} \int_0^1 A_{jt} e_{jt} dj + \tau_{bt} \int_0^1 b_{jt} dj \right)^\phi - \frac{1}{2\beta_{it}} e_{it}^2 \end{aligned} \quad (4.17)$$

Where $b_{it} = \alpha w_{it} = (1 - \tau_{yt})(A_{it} e_{it} + \eta_i) + k_{it-1}$. The optimal effort is discouraged by the bequest tax and by the income tax:

$$e_{it} = (1 - \tau_{bt})^\alpha (1 - \tau_{yt}) A_{it} \beta_i$$

Plugging the optimal value of e_{it} in 4.17, the explicit private utility function is given by:

$$\begin{aligned}
u_{it} = & (1 - \tau_{bt})^\alpha \left((1 - \tau_{yt})((1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{it}^2 \beta_i + \eta_i) + k_{it-1} \right) \\
& + B \left[\tau_{yt} \int_0^1 A_{jt}^2 \beta_j (1 - \tau_{bt})^\alpha (1 - \tau_{yt}) dj \right. \\
& + \tau_{bt} \alpha \int_0^1 \left((1 - \tau_{yt}) (A_{jt}^2 \beta_j (1 - \tau_{bt})^\alpha (1 - \tau_{yt}) + \eta_j) + k_{jt-1} \right) dj \left. \right]^\phi \\
& - \frac{A_{it}^2 \beta_i (1 - \tau_{bt})^{2\alpha} (1 - \tau_{yt})^2}{2}
\end{aligned} \tag{4.18}$$

4.5.1 FAIRNESS

As in the model with wealth tax, the total utility function includes also the preferences for fairness. Therefore we need to introduce the measure of unfairness Ω_t

$$\begin{aligned}
\Omega_t = & \int_0^1 (u_{jt} - \hat{u}_{jt})^2 dj = \\
& \int_0^1 \left(w_{jt} (1 - \tau_{bt})^\alpha + B G_t^\phi - \frac{A_{jt}^2 \beta_j (1 - \tau_{bt})^{2\alpha} (1 - \tau_{yt})^2}{2} - \hat{u}_{jt} \right)^2 dj
\end{aligned} \tag{4.19}$$

The value of fair utility includes the disutility of effort:

$$\hat{u}_{it} = \hat{w}_{it} - \frac{A_{it}^2 \beta_i (1 - \tau_{bt})^{2\alpha} (1 - \tau_{yt})^2}{2} \tag{4.20}$$

The fair level of wealth does not comprehend luck nor redistribution:

$$\hat{w}_{it} = (1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{it}^2 \beta_i + \hat{k}_{it-1} \tag{4.21}$$

The optimal fair consumption and fair capital are:

$$\widehat{c}_{it} = (1 - \alpha)\widehat{w}_{it} \quad \widehat{k}_{it} = \alpha\widehat{w}_{it} \quad (4.22)$$

Plugging 4.18, 4.20 and 4.21 in 4.19 we obtain:

$$\begin{aligned} \Omega_t = & \int_0^1 \left\{ (1 - \tau_{bt})^\alpha \left((1 - \tau_{yt}) \left((1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{jt}^2 \beta_j + \eta_j \right) + k_{jt-1} \right) \right. \\ & B \left[+ \tau_{yt} \int_0^1 A_{jt}^2 \beta_j (1 - \tau_{bt})^\alpha (1 - \tau_{yt}) dj \right. \\ & + \tau_{bt} \alpha \int_0^1 \left((1 - \tau_{yt}) \left(A_{jt}^2 \beta_j (1 - \tau_{bt})^\alpha (1 - \tau_{yt}) \right) + k_{jt-1} \right) dj \left. \right]^\phi \\ & \left. - (1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{jt}^2 \beta_j - \widehat{k}_{jt-1} \right\}^2 dj \end{aligned} \quad (4.23)$$

Also in this case a probabilistic voting framework is used. The two political parties L and R commit simultaneously to the tax rates τ_{yt} and τ_{bt} .

Lemma 4.2. *In pairwise majority voting a unique equilibrium exists in which parties L and R select the same policy variable, $\tau_{yt}^L = \tau_{yt}^R \equiv \tau_{yt}^*$, and $\tau_{bt}^L = \tau_{bt}^R = \tau_{bt}^*$ given by*

$$\tau_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \widehat{U}_{it}(\tau_{yt}, \tau_{bt}) di. \quad (4.24)$$

After voting, individuals decide how much effort to produce. Again there is full commitment to the fiscal policy by the parties. The intergenerational links are again represented by abilities, actual capital, and fair capital.

$$\begin{aligned}
A_{it} = & r_i + \omega \tau_{yt-1} \int_0^1 A_{jt-1}^2 \beta_j (1 - \tau_{bt-1})^\alpha (1 - \tau_{yt-1}) dj \\
& + \omega \tau_{bt-1} \alpha \int_0^1 ((1 - \tau_{yt-1}) (A_{jt-1}^2 \beta_{j-1} (1 - \tau_{bt-1})^\alpha (1 - \tau_{yt-1})) + k_{jt-2}) dj
\end{aligned}$$

$$k_{it} = \alpha(1 - \tau_{bt}) ((1 - \tau_{yt}) ((1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{it}^2 \beta_i + \eta_i) + k_{it-1}) dj$$

$$\widehat{k}_{it} = \alpha \left((1 - \tau_{yt})(1 - \tau_{bt})^\alpha A_{it}^2 \beta_i + \widehat{k}_{it-1} \right)$$

4.5.2 IMPORTANCE OF FAIRNESS

As in the model with wealth tax, the fact that a country cares about fairness has a strong impact on the voting and on the economy. Assume there are two countries: Country A and Country B. Country A represents the benchmark model with bequest tax and income tax, while individuals in Country B do not care about the unfairness in society, i.e. $\gamma = 0$.

The result, as in Figure 4.8, is that the society that cares about unfairness shows higher levels of redistribution. Both the income tax and the bequest tax are higher compared to those in the society where the individuals care only about the personal gain they get from redistribution.

In this case, however, the tax burden is so heavy for Country A that even if it should bring higher abilities and therefore higher per capita income, the disincentive effect on effort causes lower abilities and lower per capita income. As a result, Country A is caught in a poverty trap.

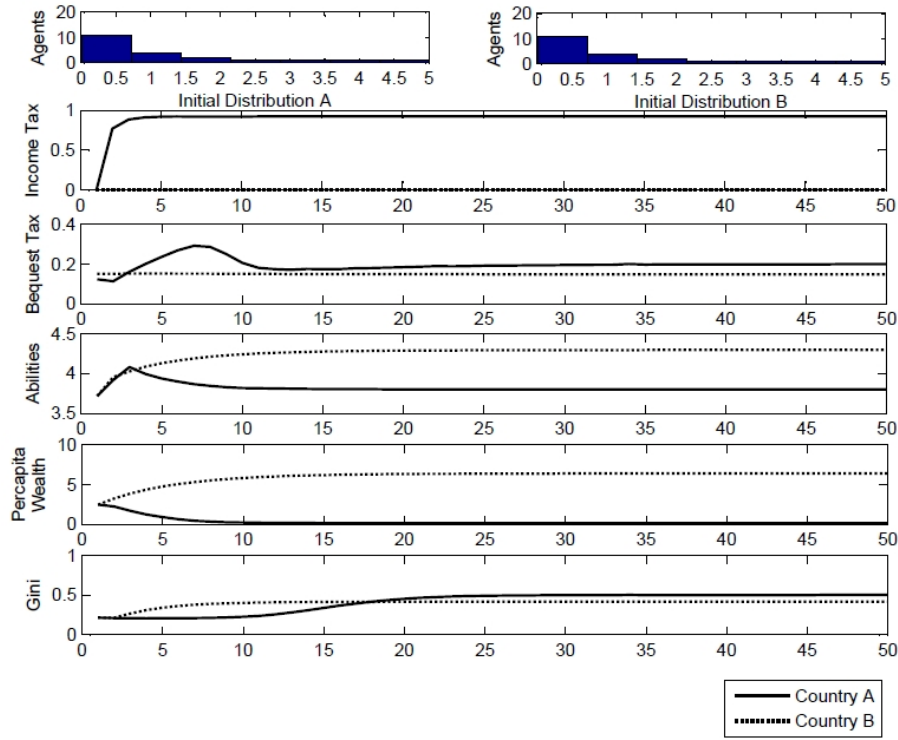


Figure 4.8: Different Ideologies with Bequest

As in Chapter 3, the results of the model with bequest tax and income tax are specular compared to the results with wealth tax. The decision of public spending allocation between public education and public good, in fact, is solely dependent on the parameter ω .

4.6 OPTIMAL ALLOCATION OF TRANSFERS, PUBLIC GOOD AND PUBLIC EDUCATION

Up to now we assumed that the government allocates public expenditure between the public good and public schooling. However, the reader might wonder if individuals

would still allocate resources to public schooling and the public good if they could instead devolve resources to transfers that would increase their per capita wealth.

In this section we analyse voting reactions when individuals decide how to allocate tax revenues between transfers and public good/public education. The allocation is decided at the voting stage by the individuals. The form of the utility function is the same as in the previous sections.

$$u_{it} = \frac{c_{it}^{1-\alpha} k_{it}^\alpha}{(1-\alpha)^{1-\alpha} \alpha^\alpha} + BG_t^\phi - \frac{1}{2\beta_{it}} e_{it}^2, \quad (4.25)$$

The private budget constraint also does not change:

$$w_{it} = k_{it} + c_{it}$$

The after tax end of life wealth w_{it} depends on abilities, effort, luck, capital inherited from the previous generation, and the lump sum transfers:

$$w_{it} = (A_{it}e_{it} + \eta_i + k_{it-1})(1 - \tau_t) + T_t. \quad (4.26)$$

The optimal amounts of capital and fairness are represented by a proportion of the end of life net wealth:

$$k_{it} = \alpha w_{it} \quad c_{it} = (1 - \alpha) w_{it}$$

The total tax revenues E_t must be allocated between the public good, public schooling, and transfers:

$$E_t = T_t + G_t = T_t + g_t + h_t$$

As in the original model in section 4.3, the government decides how to allocate wealth between the public good and public schooling according to the proportion ω and $(1 - \omega)$. The allocation between G_t and T_t is decided by the individuals during voting, according to the proportion ρ and $(1 - \rho)$ ⁷. While ω is an exogenous parameter, ρ is endogenous and its optimal value is decided through voting together with the optimal taxation. The expenditure for the public good, education, and transfers cannot exceed the tax revenues for each generation:

$$h_t + g_t + T_t = \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj$$

The tax revenues do not include luck, as it brings no productive contribution on average.

The optimal public resource allocation is:

$$\begin{aligned} T_t &= \rho_t \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj \\ h_t &= (1 - \rho_t) \omega \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj \\ g_t &= (1 - \rho_t)(1 - \omega) \tau_t \int_0^1 (A_{jt}e_{jt} + k_{jt-1})dj \end{aligned}$$

Plugging in 4.25 the optimal values of the capital, consumption, transfers, public schooling, and effort, the private utility becomes:

⁷As ω , also $\rho \in (0, 1)$.

$$\begin{aligned}
u_{it} = & (1 - \tau_t) (A_{it}^2 \beta_{it} (1 - \tau_t) + \eta_i + k_{it-1}) + \rho_t \tau_t \int_0^1 (A_{jt}^2 \beta_{jt} (1 - \tau_t) + k_{jt-1}) dj \\
& + B \left((1 - \rho_t) \tau_t \int_0^1 (A_{jt}^2 \beta_{jt} (1 - \tau_t) + k_{jt-1}) dj \right)^\phi - \frac{A_{it}^2 \beta_{it} (1 - \tau_t)^2}{2}
\end{aligned}$$

The optimal effort 4.3 is the same as in the model with wealth tax, as the fair variables 4.6, 4.8, 4.7, and the measure of unfairness 4.4. The indirect utility function becomes:

$$\begin{aligned}
U_{it} = & [A_{it}^2 \beta_i (1 - \tau_t) + \eta_i + k_{it-1}] (1 - \tau_t) + \rho_t \tau_t \int_0^1 (A_{jt}^2 \beta_{jt} + k_{jt-1}) dj \\
& + B \left((1 - \rho_t) \tau_t \int_0^1 [A_{jt}^2 \beta_j (1 - \tau_t) \tau_t + \tau_t k_{jt-1}] dj \right)^\phi - (1 - \tau_t)^2 \frac{A_{it}^2 \beta_i}{2} \\
& - \gamma \int_0^1 \left[\begin{aligned} & (A_{jt}^2 \beta_j (1 - \tau_t) + \eta_j + k_{jt-1}) (1 - \tau_t) + \rho_t \tau_t \int_0^1 (A_{jt}^2 \beta_{jt} + k_{jt-1}) dj \\ & + B \left((1 - \rho_t) \int_0^1 (A_{jt}^2 \beta_j (1 - \tau_t) \tau_t + \tau_t k_{jt-1}) dj \right)^\phi - A_{jt}^2 \beta_j (1 - \tau_t) - \widehat{k}_{jt-1} \end{aligned} \right]^2 dj \\
\equiv & \hat{U}_{it}(\tau_t). \tag{4.27}
\end{aligned}$$

Parties L and R this time commit simultaneously to the optimal taxation τ_t and to the optimal allocation of public funds ρ_t :

Lemma 4.3. *In pairwise majority voting a unique equilibrium exists in which parties L and R select the same policy variable, $\tau_t^L = \tau_t^R \equiv \tau_t^*$, and $\rho_t^L = \rho_t^R = \rho_t^*$ given by*

$$\pi_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \hat{U}_{it}(\tau_t, \rho_t) di. \tag{4.28}$$

Where π_t^* is the combination of the optimal policy τ_t^* and ρ_t^* . After voting, individuals decide how much effort to produce. The intergenerational links are represented by the abilities, actual capital, and fair capital:

$$A_{it} = h_{t-1} + r_i = \omega(1 - \rho_{t-1})\tau_{t-1} \int_0^1 [A_{jt-1}^2 \beta_j (1 - \tau_{t-1})\tau_{t-1} + \tau_{t-1}k_{jt-2}] dj + r_i$$

$$k_{it} = \alpha \left((1 - \tau_t) (A_{it}^2 \beta_i (1 - \tau_t) + \eta_t + k_{it-1}) + \rho_t \tau_t \int_0^1 [A_{jt}^2 \beta_i (1 - \tau_t)\tau_t + \tau_t k_{jt-1}] dj \right)$$

$$\widehat{k}_{it} = \alpha A_{it}^2 \beta_i (1 - \tau_t) + \alpha \widehat{k}_{it-1}$$

4.6.1 THE ROLE OF FAIRNESS

Again we analyse two countries: Country A is as described in 4.27 while in Country B individuals do not care about unfairness, i.e. $\gamma = 0$. The results are similar to the results in section 4.3. The country which does not care about fairness has lower levels of redistribution⁸, with lower abilities, lower per capita income and a higher Gini coefficient. In both countries, individuals divide the tax revenues between transfers, the public good, and education, without using all the revenues for the transfers. In particular, in the value of ρ is 0.758 in Country A and 0.508 in Country B.

⁸With these specific parameter the tax is really small, 0.0022, but it is possible to obtain higher level with different parameter. We are mainly interested in the fact that it is positive.

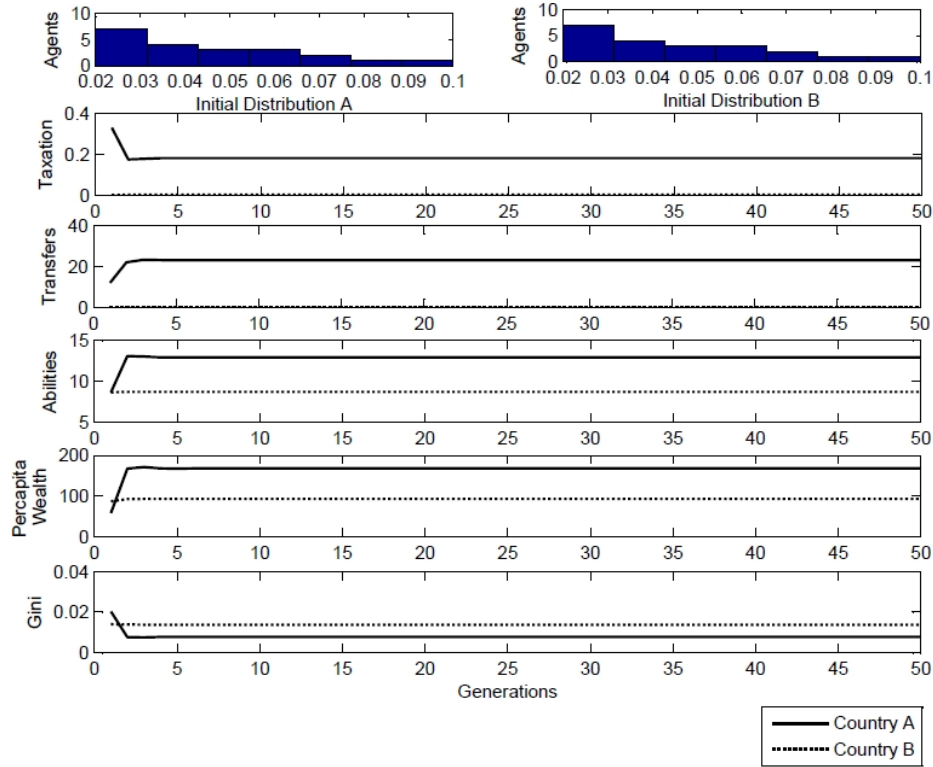


Figure 4.9: Different Ideologies with Transfers

The results obtained in this section replicate the results with only the public good and public education. Therefore, the model is robust to the introduction of transfers.

4.7 CONCLUSIONS

This chapter analyses the impact of ideology, and in particular of the idea of fairness, on public education. Personal ideas about what is fair in a society help shaping the preferences for redistribution and influence the economic fundamentals. Public education is one these. There are two main issues analysed in this chapter: 1) how the idea of fairness influences public education, 2) how public education influences the idea of fairness.

The more a country cares about fairness, the higher the wealth tax is going to be and, therefore, the higher the abilities and the per capita income. However, a Laffer curve is present: if the taxation is too heavy it will discourage the effort so much that the tax revenues will be small and, hence, also the public expenditure for education and the per capita income.

At the same time, public schooling influences ideology. A relatively high initial level of education reduces the dependence of wealth on luck and makes individuals believe to live in a more just world. This has an impact on voting and on the expenditure for public education.

In conclusion, this chapter adds a new point of view to the literature about public education and to the literature about fairness, by connecting the two for the first time and observing how they shape the preferences for redistribution and the economic outcomes of elections. In the future, the analysis of the connection between public education and ideology could be deepened by introducing a more complex function of learning that depends on the innate abilities or by introducing private education along public education. Moreover, in this simple framework we do not consider the effect of political institutions on the government expenditure allocation. However, public good provision depends also on the political institution (Marsiliani and Renstrom, 2007), and this might be the target of future research.

CHAPTER 5

TAX DIFFERENTIAL, WEALTH TAX AND THE INFLUENCE OF IDEOLOGY

5.1 INTRODUCTION

This Chapter, co-authored with Guido Cozzi, extends the model presented in Chapter 3 by introducing a wealth tax and an income tax. In several western democracies not only income, but also wealth is taxed. Motives for redistribution have already been studied for the income tax and for a general wealth tax and were found to be not only consistent with how much one can get from redistribution, but to depend also on other factors such as the ethnic composition of the country (Luttmer 2001, Alesina and La Ferrara 2005); the struggle between the signals received from the society and the willingness to belief in a just world (Bénabou and Tirole 2006), and distaste for unfairness or willingness to live in a system able to provide the same opportunity to everyone (Fong 2001, Alesina and Glaeser 2004, Alesina and Angeletos 2005a, Alesina et al. 2009).

On the one hand, our work deepens the analysis of the connection between ideas of fairness and redistribution and how these evolve over time, and, on the other hand, it considers a society in which two instruments are available: an income tax and a wealth tax. The main novelty of this chapter, compared to the existing literature, is that we study the effect of ideology on an income and capital tax model. In fact, at

least to our knowledge, the effect of ideology has only been study on taxes income or end of life total wealth. However, in this chapter we will prove that if individuals care about social justice, then an income and a wealth tax are not equivalent, and depend on the perception of individuals. At the same time the pressure and composition of taxes impose a feedback mechanism on the ideology, influencing future generations.

To avoid double taxation of the income we compute a *tax differential*, which means that we subtract the income tax from the wealth tax. We build a simple model in which there is a tax on income and a tax on wealth that is comprehensive of deduction from the income tax. This particular formulation allow us to avoid double counting and differentiate between the part of wealth deriving from work (so from effort and ability) and part of wealth deriving from the capital inherited from the previous generation. In fact, if the government can subtract income from wealth and tax them separately, it can impose a taxation that maximizes the productivity and at the same time increase the equality in society. The fiscal policy in this case is the opposite compared to what the literature has suggested up to now: the growth enhancing and fair taxation is represented by a combination of heavy wealth tax and light income tax.

Our work is innovative in many aspects, but strongly relates to the recent literature on capital taxation. The economy is populated by a continuum of individuals who live for one period only, leaving bequest to the subsequent generation. At the beginning of each generation, decisions about capital tax and income tax are taken by individuals, who then choose the effort level, consumption, and bequest. As in Farhi and Werning (2008), we use a probabilistic voting framework in order to simulate the decision making process. But differently from them we obtain positive capital taxation although there is perfect commitment in the model.

In our case, the wealth tax arises from the distaste for unfairness. For the first time, at least to our knowledge, the motive for wealth taxation derives from non-

selfish motivations. In our model, therefore, it is not always true that more unequal countries redistribute more and have higher wealth tax.

By plotting at a basic linear interpolation between 30 OECD countries it is possible to notice that it would be very difficult to state that there is a positive association between the Gini Coefficient and the revenues from Estate, Inheritance and Gift tax as a percentage of GDP¹.

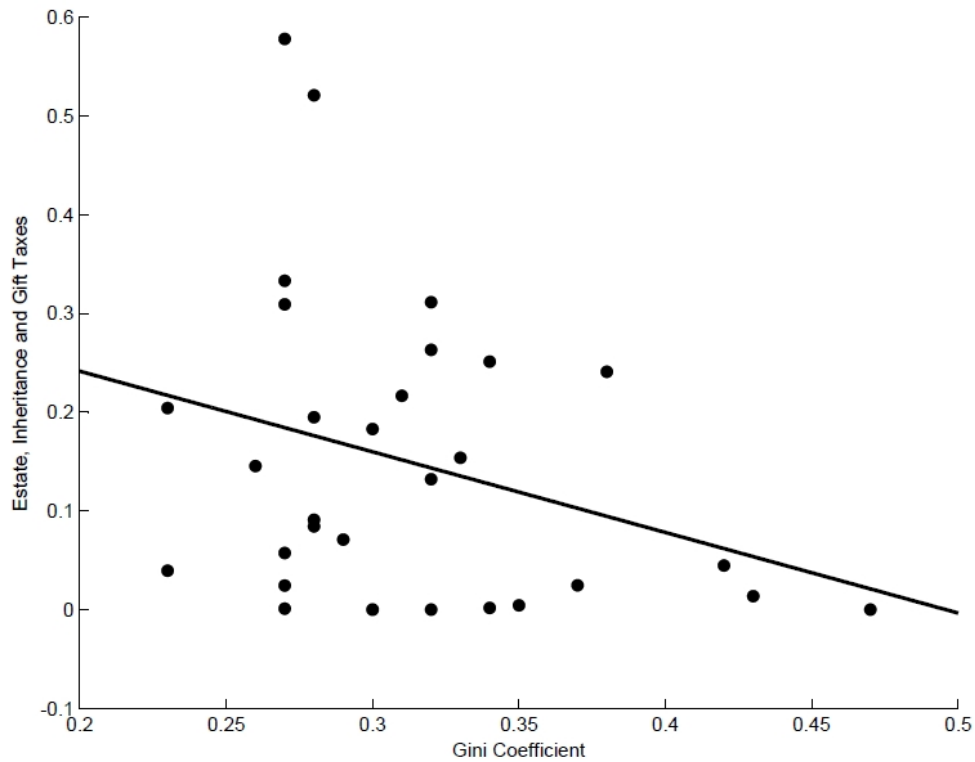


Figure 5.1: Estate Tax and Gini Coefficient

Therefore, there must be something more than the decreasing marginal utility in wealth to drive the decision about the tax rate, such as ideology and the willingness to live in a just world.

¹The data refer to the year 2005, and are obtained from the OECD website:

OECD Factbook 2010: Economic, Environmental and Social Statistics - ISBN 92-64-08356-1 - © OECD 2010 for the Gini Coefficient ; and *Dataset: Revenue Statistics - Comparative tables* for the revenues from Estate, Inheritance and Gift taxes (code 4300).

It should be noticed that our economy is populated by individuals who live for one period only. Therefore, the wealth tax coincides *de facto* with the inheritance tax. In this way, not only is the motive for redistribution important, but also the motive for bequest itself. In other words, the specification of the inner reason that pushes parents to reduce their consumption and leave inheritance to their children. In some models the bequest is just accidental, in the sense that parents do not plan to leave bequest, but it arises from the fact that individuals need to have precautionary savings because of the imperfection of the markets (Abel, 1985). However, in more recent models, parents consciously decide to leave bequest to their children. In some models, parents care about the utility deriving from consumption of their children (as in Farhi and Werning 2008). In others, parents care about the income that the children will receive (as the “joy-of-children-receiving-income” by Grossman and Poutvaara, 2009). In this work, we propose a joy-of-giving² form of altruism (also defined warm glow altruism), as in Bossmann et al. (2007) and Michel and Pestieau (2004).

An aspect that needs to be analysed is the timing of the tax implementation. In our work, as in Michel and Pestieau (2004), the tax is imposed on the generation that receives the bequest, and can therefore be considered as an inheritance tax. Moreover, the income tax will be imposed at the end of the life of each generation. In other works the timing is different from ours; in Farhi and Werning (2008), for example, individuals first observe their productivity (or the shock on the productivity in the model with infinite horizon), and then take decisions about effort. After that, individuals vote for parties according to the platform they propose and their taste or distaste for the party. The winning party implements tax rates on the income and on the bequest. Agents consume and take decisions about the investment of capital. In period two, the candidates decide whether to reform the system or not.

²The warm glow altruism was introduced by Andreoni (1990).

In the present work, not only is the steady state determined analytically, but the entire transition path is going to be studied. In this way it is possible to observe the evolution of the inheritance tax and of the income tax, the evolution in inequality and fairness, and their interdependence.

The present chapter is organized as follows. Section 5.2 describes the model and presents the analytical results. Section 5.3 illustrates the results of numerical experiments. Section 5.4 concludes. The Matlab codes used in the present chapter are available from the authors upon request.

5.2 THE ECONOMY

As in Alesina and Angeletos (2005a), and Alesina et al. (2009), we have non overlapping generations t of individuals, with only one active individual per family and constant population. Each individual, indexed by $i \in [0, 1]$, lives for one period and perfectly inherits willingness to work $\beta_i > 0$, luck, $\eta_i \in R$ with $\int_0^1 \eta_i di = 0$ and innate abilities, $A_i > 0$. The private utility u_{it} depends positively on consumption c_{it} , and on the bequest to the next generation, k_{it} - which we label "capital" - and negatively on effort, e_{it} :

$$u_{it} = \frac{1}{(1 - \alpha)^{1-\alpha} \alpha^\alpha} c_{it}^{1-\alpha} k_{it}^\alpha - \frac{1}{2\beta_i} e_{it}^2,$$

Where $0 < \alpha < 1$ is the intergenerational generosity parameter. The final life gross wealth is:

$$z_{it} = A_i e_{it} + \eta_i + k_{it-1}. \quad (5.1)$$

For simplicity, initial capital is assumed to yield no return. Each generation votes on the wealth tax rate, τ_{wt} , which is proportionally applied to end-of-life gross wealth z_{it} and on the income tax rate τ_{yt} ; all tax revenues are to be redistributed lump sum to all individuals. Being income added to wealth, the fiscal authorities, in order to avoid double taxation, compute a (possibly negative) income tax differential, T_{yt} . Therefore the actual income tax rate is $\tau_{yt} = T_{yt} + \tau_{wt}$. Hence, we denote end of life post-tax and transfer wealth as:

$$w_{it} = (1 - \tau_{wt})z_{it} - T_{yt}(A_i e_{it} + \eta_i) + G_t \quad (5.2)$$

where $G_t = \tau_{wt} \int_0^1 z_{jt} dj + T_{yt} \int_0^1 (A_j e_{jt} + \eta_j) dj$ is the per capita lump sum government transfer. The government budget is always balanced.

Using the previous definitions, the end of life wealth of each individual is:

$$w_{it} = (1 - \tau_{wt})z_{it} - T_{yt}(A_i e_{it} + \eta_i) + G_t = (A_i e_{it} + \eta_i)(1 - \tau_{yt}) + (1 - \tau_{wt})k_{it-1} + G_t \quad (5.3)$$

which means that the wealth and income tax menu we are studying in our stylized economy turns out to be equivalent to an income tax plus a delayed bequest tax. This makes sense because the individual gets her wealth taxed at a tax rate except when her wealth is the result of her income, in which case it is taxed at the income tax. In our simplified economy, with no marriage market and no life-cycle structure, the only part of someone's wealth that cannot be subject to the income tax would be her inherited initial wealth. However, in a more complex model, this simplified interpretation may be blurred.

In the special case of $\tau_{wt} = \tau_{yt}$, the model becomes equivalent to the one in Chapter 3. Unlike what happens in Chapter 3, here the voters have an additional fiscal instrument to choose, which, in a symmetric probabilistic voting framework, would allow for a better outcome (higher aggregate utility). If voters choose $\tau_{wt} > \tau_{yt}$, the individual taxpayer would have an incentive to report as much taxable income as possible in order to obtain tax credit $-T_{yt} = \tau_{wt} - \tau_{yt}$.

Notice that in our stylized economy, individual income is $y_{it} = (A_i e_{it} + \eta_i)(1 - \tau_{yt}) - \tau_{wt} k_{it-1} + G_t$, and the aggregate income of generation t is

$$Y_t = \int_0^1 [(A_j e_{jt} + \eta_j)(1 - \tau_{yt}) - \tau_{wt} k_{jt-1} + G_t] dj = \int_0^1 A_j e_{jt} dj,$$

which is identical to per capita income due to the population normalization.

It is important to remark that, according to our assumed tax policy, all incomes would be subject only to proportional income taxation τ_{yt} : even the interest incomes on initial bequest would *not* be subject to the wealth tax τ_{wt} , but to the income tax. That is, if we had assumed positive real interest rate $\rho > 0$, the final life individual income would be equal to:

$$Y_t = \int_0^1 [(A_j e_{jt} + \eta_j)(1 - \tau_{yt}) - \tau_{yt} \rho k_{jt-1} - \tau_{wt} k_{jt-1} + G_t] dj = \int_0^1 A_j e_{jt} dj, \quad (5.4)$$

and therefore our assumed wealth/bequest tax rate, by not hitting capital incomes, would not distort saving decisions in a growth harmful way.

Warm glow intergenerational altruism implies that fraction α of end of life wealth is bequeathed, as seen by maximizing u_{it} subject to $c_{it} + k_{it} = w_{it}$. Therefore, plugging the optimal consumption and bequest into the private utility function, we obtain:

$$u_{it} = w_{it} - \frac{e_{it}^2}{2\beta_i}. \quad (5.5)$$

Individuals vote on taxation at the beginning of life, before deciding on effort. Maximizing u_{it} , using (5.5), (5.1), and (5.2), gives

$$e_{it} = (1 - \tau_{yt})A_i\beta_i, \quad (5.6)$$

which shows that individual effort gets discouraged only by expected income taxation, and is increasing in the individual work ability and decreasing in the disutility of effort. This suggests that our income corrected wealth tax rate (in practice a delayed bequest tax) could be the best fiscal instrument to reduce unfairness, because it does not discourage individual effort.

5.2.1 IS INCOME TAX HARMFUL FOR GROWTH?

In this framework, we prove that, in our stylized economy, there is a strong case for using only the wealth tax. In fact, in light of eq. (5.6) and eq. (5.4) for aggregate income becomes:

$$Y_t = \int_0^1 A_j(1 - \tau_{yt})A_j\beta_j dj = (1 - \tau_{yt}) \int_0^1 A_j^2\beta_j di \equiv (1 - \tau_{yt})\bar{\delta}. \quad (5.7)$$

Eq. (5.7) implies that per capita income is a decreasing function of the income tax rate. The following therefore holds:

Proposition 5.1. *The wealth tax does not affect aggregate income, and if all redistribution was carried out by taxing wealth, aggregate income would be maximized in every generation.*

Notice that, no matter the level of the wealth tax rate, zero income tax would always imply maximum aggregate income in each generation. Of course, maximum aggregate GDP is not the same thing as maximum utility. However, it also implies that:

Proposition 5.2 *The steady state aggregate wealth is maximized when only bequest wealth is taxed.*

Proof. Integrating (5.3) we can derive a law of motion of aggregate wealth W_t as follows:

$$W_t = \int_0^1 w_{jt} dj = Y_t + \int_0^1 k_{jt-1} dj = Y_t + \int_0^1 \alpha w_{jt-1} dj = Y_t + \alpha W_{t-1}. \quad (5.8)$$

In a steady state the income tax rate is constant, i.e. $\tau_{yt} = \tau_y$, and hence (5.7) implies that $Y_t = (1 - \tau_y)\bar{\delta}$. Plugged into (??) gives:

$$W = (1 - \tau_y)\bar{\delta} + \alpha W = \frac{(1 - \tau_y)\bar{\delta}}{1 - \alpha}. \quad (5.9)$$

Therefore, regardless of the level of the wealth tax rate, the highest aggregate wealth level is achieved if $\tau_y = 0$. This is certainly achieved if wealth tax was the only tax instrument used in this economy. QED

Let us remark that we have not found the best tax policy, but the class of GDP enhancing tax policies: they include a positive tax (to be decided by voters) on the stock of wealth of the individuals, with the possibility of deducting all incomes from the tax base. In our stylized economy, this scheme unravels back to waive taxes from all saved income, leaving only the initial bequest taxed. Hence, a highly skilled individual with little initial bequest will favour this policy a lot, whereas the lazy

child of a rich family would strongly oppose it. According to this policy, individuals have no incentive whatsoever to hide their income, because every penny of income declared to IRS implies a tax reduction.

5.2.2 FAIRNESS AND POLITY

As in Alesina and Angeletos (2005a) individuals tolerate inequality when it derives from effort and abilities, but do not tolerate it when it derives from luck or transfers.

The utility and wealth considered fair by the individuals are:

$$\begin{aligned}\widehat{u}_{it} &= \widehat{w}_{it} - \frac{e_{it}^2}{2\beta_i}, \\ \widehat{w}_{it} &= A_i e_{it} + \widehat{k}_{it-1}.\end{aligned}$$

We define fair consumption, fair bequest, and fair disposable wealth as:

$$\widehat{c}_{it} = (1 - \alpha)\widehat{z}_{it} \quad \widehat{k}_{it} = \alpha\widehat{z}_{it} \quad \widehat{z}_{it} = \widehat{w}_{it} = A_i e_{it} + \widehat{k}_{it-1}. \quad (5.10)$$

The generation t individual i utility, U_{it} , is defined as:

$$U_{it} = u_{it} - \gamma\Omega_t, \quad (5.11)$$

where

$$\Omega_t = \int_0^1 (u_{jt} - \widehat{u}_{jt})^2 dj = \int_0^1 (w_{jt} - \widehat{w}_{jt})^2 dj. \quad (5.12)$$

and $\gamma > 0$ is the parameter which measures the importance of unfairness for society.

As in Chapter 3 we use a probabilistic voting model, where there are two parties L and R , that simultaneously commit to a tax rate menu $(\tau_{yt}^L, \tau_{wt}^L) \in [0, 1]^2$, $P = L, R$, at the beginning of each period. The individuals vote for a party at the beginning of their life. Then the individuals choose efforts. The party that obtained the majority of the votes is the only one in office, and it will apply the announced tax rates and will redistribute accordingly. Finally, individuals choose their consumption and bequest. Individuals have heterogeneous degrees of political party identification. Hence, the complete utility function including economic variables and party identification is the following:

$$\tilde{U}_{itP} = u_{it} - \gamma\Omega_t + (\sigma_{it} + \varepsilon_t)\chi_L(P), \text{ where } P = L, R.$$

Variable P denotes the party in office. Indicator $\chi_L(P)$ takes on value 1 if $P = L$ and 0 if $P = R$. Random variable σ_{it} (uniformly distributed on support $\left[-\frac{1}{2\varphi_i}, \frac{1}{2\varphi_i}\right]$) represents individual i 's pro-party L ideological bias, while ε_t (uniformly distributed on support $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$) is an aggregate random variable capturing party L 's popularity for generation t , with $\psi > \varphi_i$, $\forall i \in [0, 1]$. The two parties commit to their tax rates before they know the realization of the random variables ε_t and σ_{it} . They only care about winning the election, and hence choose their policies $(\tau_{yt}^L, \tau_{wt}^L)$ and $(\tau_{yt}^R, \tau_{wt}^R)$ by trying to maximize the probability of being elected.

5.2.3 EQUILIBRIUM AND DYNAMICS

After simple substitutions, and momentarily neglecting the party L bias components, we obtain the indirect utility function of each individual in each generation. That

function ultimately depends on exogenous parameters, on expected taxation and on all the wealth distribution of the previous generation:

$$\begin{aligned}
U_{it} &= [\delta_i(1 - \tau_{yt}) + \eta_i](1 - \tau_{yt}) + k_{it-1}(1 - \tau_{wt}) \\
&+ \int_0^1 [\delta_j(1 - \tau_{yt})\tau_{yt} + \tau_{wt}k_{jt-1}] dj - (1 - \tau_{yt})^2 \frac{\delta_i}{2} \\
&- \gamma \int_0^1 \left[\frac{[\delta_s(1 - \tau_{yt}) + \eta_s](1 - \tau_{yt}) + k_{st-1}(1 - \tau_{wt}) +}{\int_0^1 [\delta_j(1 - \tau_{yt})\tau_{yt} + \tau_{wt}k_{jt-1}] dj - \delta_s(1 - \tau_{yt}) - \hat{k}_{st-1}} \right]^2 ds \\
&\equiv \hat{U}_{it}(\tau_{yt}, \tau_{wt}).
\end{aligned} \tag{5.13}$$

Where $\delta_i \equiv A_i^2 \beta_i$. It is straightforward to see that (the proof follows the steps of the proof of Lemma 3.1).

Lemma 5.1. *In pairwise majority voting, there exists a unique equilibrium in which the two parties select the same policy variable, $(\tau_{yt}^L, \tau_{wt}^L) = (\tau_{yt}^R, \tau_{wt}^R) = (\tau_{yt}^*, \tau_{wt}^*)$, given by*

$$(\tau_{yt}^*, \tau_{wt}^*) = \arg \max_{(\tau_{yt}, \tau_{wt}) \in [0,1]^2} \int_0^1 \varphi_i \hat{U}_{it}(\tau_{yt}, \tau_{wt}) di. \tag{5.14}$$

As in other probabilistic voting models, the same equilibrium policy variable would also be chosen by a biased social planner who maximizes the following weighted aggregate welfare functional:

$$W(\tau_{yt}, \tau_{wt}) \equiv \int_0^1 \varphi_i \hat{U}_{it}(\tau_{yt}, \tau_{wt}) di,$$

with each individual's indirect utility function (where effort, consumption, and bequest are all optimal) being weighted inversely to vulnerability, $1/\varphi_i$, to party-related attributes. In the special case of individuals who have the same densities $\varphi_i = \varphi$, Lemma 5.1 implies that $(\tau_{yt}^*, \tau_{wt}^*) = \arg \max_{(\tau_{yt}, \tau_{wt})} W(\tau_{yt}, \tau_{wt})$ would coincide with the tax rate chosen by a social planner who adopts a utilitarian welfare functional. Notice that, from eq. (5.13), the equilibrium tax rates $(\tau_{yt}^*, \tau_{wt}^*)$ will depend on generation $t-1$'s bequest distribution k_{t-1} , generation $t-1$'s fair bequest distribution \widehat{k}_{t-1} , and of course on the parameter vectors δ and η ; that is $(\tau_{yt}^*, \tau_{wt}^*) = \Upsilon(k_{t-1}, \widehat{k}_{t-1}, \delta, \eta)$.

The equilibrium tax rates $(\tau_{yt}^*, \tau_{wt}^*)$ are used to determine the level of capital k_{it} and fair capital \widehat{k}_{it} , which represent the intergenerational links:

$$k_{it} = \alpha [\delta_i(1 - \tau_{yt})^2 + \eta_i(1 - \tau_{yt}) + k_{it-1}(1 - \tau_{wt})] + \alpha G_t \quad (5.15)$$

$$\widehat{k}_{it} = \alpha \delta_i(1 - \tau_{yt}) + \alpha \widehat{k}_{it-1}. \quad (5.16)$$

5.2.4 POLITICAL EQUILIBRIUM TAX RATES

Will voters always care about macroeconomic performance? Inspired by the results illustrated in Proposition 5.1 and 5.2, will they consistently prefer a zero income tax rate? As we shall see, there are motives for doubting that all redistribution will be done by wealth/bequest taxes. For example, some voters, who have inherited a large wealth, but whose ability and will to generate income through effort is not high, would certainly prefer lower inheritance tax rates and high income tax rates, in order to redistribute income from their hard working and more able co-tax

payers. Assuming persistent abilities and luck, it is possible that less work effective individuals will eventually leave small bequests, yet, for some combinations of parameters, we cannot exclude that they would still make a case for positive income tax rates coexisting with some degree of wealth tax even in the long run. Under the assumed probabilistic voting mechanism, all voters' heterogeneities are weighted and aggregated, and therefore contribute to the final outcome. In this section we will here undertake a preliminary analytical characterization of possible interior equilibria (with positive income and wealth tax rates), and then we will move on to the numerical simulations of the most interesting cases.

If equal weights are assumed, according to Lemma 5.1 the voting equilibrium will be such that the following is maximized:

$$\begin{aligned}
& \int_0^1 \hat{U}_{it}(\tau_{yt}, \tau_{wt}) di = \\
& = \int_0^1 \left\{ \begin{aligned} & \left[\delta_j(1 - \tau_{yt}) + \eta_j \right] (1 - \tau_{yt}) + k_{jt-1}(1 - \tau_{wt}) + \\ & \int_0^1 [\delta_j(1 - \tau_{yt})\tau_{yt} + \tau_{wt}k_{jt-1}] dj - (1 - \tau_{yt})^2 \frac{\delta_i}{2} - \\ & \gamma \int_0^1 \left[\begin{aligned} & [\delta_s(1 - \tau_{yt}) + \eta_s] (1 - \tau_{yt}) + k_{st-1}(1 - \tau_{wt}) + \\ & \int_0^1 [\delta_j(1 - \tau_{yt})\tau_{yt} + \tau_{wt}k_{jt-1}] dj - \delta_s(1 - \tau_{yt}) - \hat{k}_{st-1} \end{aligned} \right]^2 ds \end{aligned} \right\} di
\end{aligned} \tag{5.17}$$

Hence we can prove the following:

Proposition 5.3. *The equilibrium value of the bequest wealth tax rate $\tau_{wt}^* \in [0, 1]$, follows a simple rule:*

$$\tau_{wt}^* = \min \left[\max \left(1 - \frac{(1 - \tau_{yt}) [\text{cov}(\delta_s, k_{st-1})\tau_{yt} - \text{cov}(\eta_s, k_{st-1})] + \text{cov}(\hat{k}_{st-1}, k_{st-1})}{\text{var}(k_{st-1})}, 0 \right), 1 \right], \tag{5.18}$$

which, if $\tau_{yt}^* = 0$ and $\tau_{wt}^* \in (0, 1)$ becomes:

$$\tau_{wt}^* = 1 + \frac{cov(\eta_s, k_{st-1}) - cov(\widehat{k}_{st-1}, k_{st-1})}{var(k_{st-1})}. \quad (5.19)$$

Proof. Taking the first derivative of (5.17) with respect to the wealth tax rate, τ_{wt} , we obtain:

$$\frac{d \left(\int_0^1 \widehat{U}_{it}(\tau_{yt}, \tau_{wt}) di \right)}{d\tau_{wt}} = 0 - \gamma \frac{d\Omega_t}{d\tau_{wt}}, \quad (5.20)$$

where

$$\begin{aligned} \Omega_t &= \int_0^1 \left\{ \int_0^1 [\delta_j(1 - \tau_{yt})\tau_{yt} + \tau_{wt}k_{jt-1}] dj - \delta_s(1 - \tau_{yt}) - \widehat{k}_{st-1} \right\}^2 ds \\ &= \int_0^1 \left[\begin{aligned} &-\delta_s(1 - \tau_{yt})\tau_{yt} + \eta_s(1 - \tau_{yt}) + k_{st-1}(1 - \tau_{wt}) \\ &+ \bar{\delta}(1 - \tau_{yt})\tau_{yt} + \tau_{wt}\bar{k}_{t-1} - \widehat{k}_{st-1} \end{aligned} \right]^2 ds \end{aligned}$$

Hence, $-\gamma \frac{d\Omega_t}{d\tau_{wt}} =$

$$\begin{aligned} &= 2\gamma \int_0^1 \left[\begin{aligned} &(\bar{\delta} - \delta_s)(1 - \tau_{yt})\tau_{yt} + \eta_s(1 - \tau_{yt}) + (k_{st-1} - \bar{k}_{t-1})(1 - \tau_{wt}) \\ &+ \bar{k}_{t-1} - \widehat{k}_{st-1} \end{aligned} \right] (k_{st-1} - \bar{k}_{t-1}) ds \\ &= 2\gamma \left[var(k_s)(1 - \tau_{wt}) - cov(\delta_s, k_s)(1 - \tau_{yt})\tau_{yt} + (1 - \tau_{yt})cov(\eta_s, k_s) - cov(\widehat{k}_{st-1}, k_{st-1}) \right] \end{aligned}$$

which satisfies Kuhn-Tucker conditions only if τ_{wt} is as in the stated expression.

QED

Remark Notice that, according to Lemma 5.2, τ_{wt} is higher if luck plays a large part in explaining beginning of life wealth (i.e. $cov(\eta_s, k_s)$ is low), and actual inheritances are not positively related with fair inheritances (i.e. $cov(\widehat{k}_{st-1}, k_s)$ is high). Moreover, if these effects are very high, τ_{wt} can even become equal to 100% (complete redistribution of bequests).

As for the income tax rate, we can differentiate (5.17) with respect to τ_{yt} getting:

$$\frac{d \left(\int_0^1 \hat{U}_{it}(\tau_{yt}, \tau_{wt}) di \right)}{d\tau_{yt}} = -\tau_{yt}\bar{\delta} - \gamma \frac{d\Omega_t}{d\tau_{yt}}, \quad (5.21)$$

but

$$\begin{aligned} \frac{d\Omega_t}{d\tau_{yt}} &= 2 \int_0^1 \left[\frac{(\bar{\delta} - \delta_s)(1 - \tau_{yt})\tau_{yt} + \eta_s(1 - \tau_{yt}) + (k_{st-1} - \bar{k}_{t-1})(1 - \tau_{wt}) + \bar{k}_{t-1} - \widehat{k}_{st-1}}{[(\bar{\delta} - \delta_s)(1 - 2\tau_{yt}) - \eta_s]} ds \right] \\ &= 2[var(\delta_s)(1 - 2\tau_{yt})(1 - \tau_{yt})\tau_{yt} - cov(\delta_s, \eta_s)(1 - \tau_{yt})^2 \\ &\quad - (1 - \tau_{yt})var(\eta_s) - cov(k_{st-1}, \delta_s)(1 - \tau_{wt})(1 - 2\tau_{yt}) \\ &\quad - cov(k_{st-1}, \eta_s)(1 - \tau_{wt}) - \int_0^1 \widehat{k}_{st-1}(\bar{\delta} - \delta_s)(1 - 2\tau_{yt})ds] \end{aligned}$$

Since in the steady state $\widehat{k}_{s\infty} = \frac{\alpha\delta_s(1-\tau_y)}{1-\alpha}$, the last integral is:

$$\int_0^1 \widehat{k}_{st-1}(\bar{\delta} - \delta_s)(1 - 2\tau_{yt})ds = (1 - 2\tau_{yt})\frac{\alpha(1 - \tau_y)}{1 - \alpha}var(\delta_s) \quad (5.22)$$

it follows that:

$$\frac{d\Omega_t}{d\tau_{yt}} = 2 \left[\begin{aligned} & var(\delta_s)(1 - 2\tau_{yt})(1 - \tau_{yt}) \left(\tau_{yt} - \frac{\alpha}{1-\alpha} \right) - cov(\delta_s, \eta_s)(1 - \tau_{yt})^2 - (1 - \tau_{yt})var(\eta_s) \\ & - cov(k_{s\infty}, \delta_s)(1 - \tau_{wt})(1 - 2\tau_{yt}) - cov(k_{s\infty}, \eta_s)(1 - \tau_{wt}) \end{aligned} \right]$$

Since $cov(k_{s\infty}, \delta_s) > 0$, then $cov(k_{s\infty}, \eta_s) > 0$. Assuming $cov(\delta_s, \eta_s) \geq 0$, it follows that $\frac{d\Omega_t}{d\tau_{yt}} < 0$ at $\tau_{yt} = 0$, that is $\tau_{yt} = 0$ is a local minimum. However, we cannot exclude that if α is small enough the derivative could change sign, which may entail a non-zero τ_{yt} provided γ is large enough.

Since, as we have seen, unambiguous predictions on the aggregate utility maximizing choices of the income tax rate cannot be guaranteed, in the next section we will show the most representative numerical simulations. What we can say is that we expect both tax rates to be positive, but that a country which taxes zero on income will have a superior macroeconomic performance, in terms of aggregate income and long run wealth.

5.3 INTERGENERATIONAL DYNAMICS

Defining initial vectors of actual and fair wealth levels, $(k_{i0}, \hat{k}_{i0})_{i \in [0,1]}$, it is possible to iterate the model for several generations, and observe the intergenerational evolution of $(k_{it}, \hat{k}_{it})_{i \in [0,1]}$ and $(\tau_{yt}^*, \tau_{wt}^*)$ for all $t \in N$ as well as the fundamentals of the economy. Therefore we trace the evolution of ideology, fairness and redistribution, as well as the aggregate GDP per capita and Gini Coefficient. We focus our attention on the effects of:

1. Difference between this model and the one presented in Chapter 3, (section 5.3.1).

2. Comparison between capital accumulated because of luck and capital accumulated because of past effort (section 5.3.2).
3. The connection between inequality and redistribution in the model (section 5.3.3)
4. Comparison between income tax and wealth tax (section 5.3.4).
5. Alternative definitions of fairness (section 5.3.5).

5.3.1 INNOVATION OF THE MODEL

The possibility of using two different tax rates enlarges the policy menu and improves the economic outcomes. In figure 5.2 we compare two economies: in the first case - in solid lines - we simulate the model presented in Chapter 3, showing the economy of a country which imposes one tax rate only τ_t . In the second one - with dashed lines - we simulate the actual model, which represents a country that can use two forms of taxation: τ_{yt} and τ_{wt} .

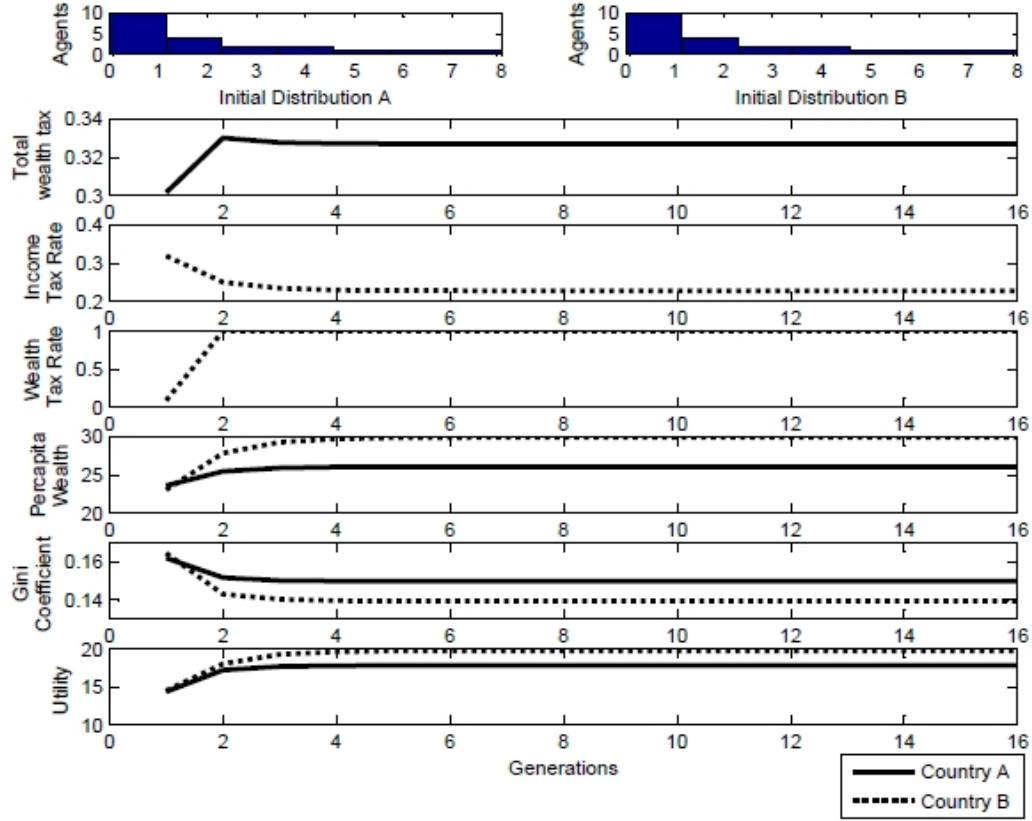


Figure 5.2: Innovation of the Model

Country A, the country which has only one fiscal tool, shows a lower per-capita wealth, a lower utility level and a higher Gini coefficient than country B. From the tests made³ the result seems really robust; in fact the results on the Gini coefficient and on the utility were verified 100% and the results on the per-capita wealth 98% of the times.

5.3.2 DIFFERENT ORIGINS OF WEALTH

³We made 100 tests for each of the cases we consider.

In this set of experiments we want to compare countries that start from the same level and distribution of accumulated capital, but with different capital origins. In the first country (A) all the wealth derives from the abilities and effort and not from luck (i.e. the variance of η , σ_η^2 , is zero, which the variance of δ , σ_δ^2 , is positive), while in the second country (B) all the wealth came from luck and not from effort (i.e. $\sigma_\eta^2 > 0$ and $\sigma_\delta^2 = 0$ ⁴). Agents respond in opposite ways to these two scenarios. In fact if the first case both the bequest tax and the income tax will tend to zero in the long run, showing that if the unfairness is so small, there is no reason to redistribute. In the second case the bequest tax will always tend to one in the steady state, while the steady state income tax will depend on the variance of η , on γ and on the value of the δ . This shows how individuals respond in a different way to a society with high unfairness according to which tax they are considering. If they are in general not willing to redistribute all the wealth deriving from work, they are willing to redistribute everything that comes from inheritance.

⁴Notice that although the variance of δ is equal to zero, the mean of the variable is not zero, otherwise we would have negative incomes.

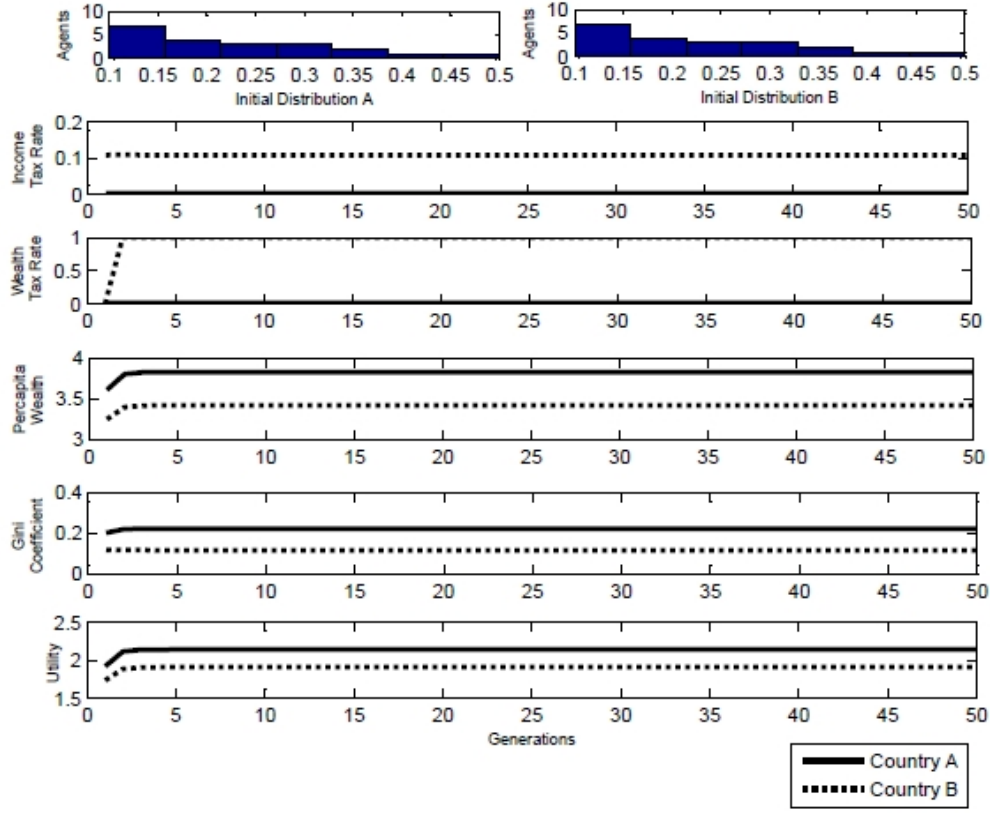


Figure 5.3: Different Origins of Wealth

As it is possible to see in the figure the individuals of the country in which wealth derives from effort do not wish to redistribute at all. On the other side, in the country where the differences in wealth depend on luck individuals vote in order to impose a confiscatory tax rate on bequest and a positive tax rate on the income.

This scenario can be easily proved analytically. For the first case, if the variance of η is equal to zero and the variance of δ is positive we obtain, from equations (5.18) and (5.21), that:

$$\frac{d \left(\int_0^1 \hat{U}_{jt}(\tau_{yt}, \tau_{wt}) dj \right)}{d\tau_{yt}} = -\tau_{yt} \bar{\delta} - \gamma 2 \left[\begin{array}{c} \text{var}(\delta_s)(1 - 2\tau_{yt})(1 - \tau_{yt}) \\ \left(\tau_{yt} - \frac{\alpha}{1-\alpha} \right) - \text{cov}(k_{s\infty}, \delta_s)(1 - \tau_{wt})(1 - 2\tau_{yt}) \end{array} \right],$$

which has a local maximum when $\tau_{yt} = 0$. And therefore:

$$\frac{d \left(\int_0^1 \hat{U}_{jt}(\tau_{yt}, \tau_{wt}) dj \right)}{d\tau_{wt}} = -2\gamma \left[\text{var}(k_s)(1 - \tau_{wt}) - \text{cov}(\hat{k}_{st-1}, k_{st-1}) \right]$$

that has a local maximum when $\tau_{wt} = 0$.

In the second case, where $\sigma_\eta^2 > 0$ and the variance of $\sigma_\delta^2 = 0$, wealth taxation will be equal to one:

$$\begin{aligned} \frac{d \left(\int_0^1 \hat{U}_{jt}(\tau_{yt}, \tau_{wt}) dj \right)}{d\tau_{wt}} &= -2\gamma \left[\text{var}(k_s)(1 - \tau_{wt}) + (1 - \tau_{yt})\text{cov}(\eta_s, k_s) - \text{cov}(\hat{k}_{st-1}, k_{st-1}) \right], \text{ and} \\ \tau_{wt} &= 1 + \frac{(1 - \tau_{yt})\text{cov}(\eta_s, k_s) - \text{cov}(\hat{k}_{st-1}, k_{st-1})}{\text{var}(k_s)} \end{aligned}$$

Notice that this has a local maximum where the bequest tax is approximately equal to 1.

On the other side, the FOC for income taxation is⁵:

$$\frac{dU_t}{d\tau_{yt}} = -\tau_{yt}\bar{\delta} - \gamma 2 \left(-(1 - \tau_{yt})\text{var}(\eta_s) - \text{cov}(k_{s\infty}, \eta_s)(1 - \tau_{wt}) \right) = 0$$

and therefore:

$$\tau_{yt}^* = \frac{\gamma 2 \text{var}(\eta_s)}{\bar{\delta} + \gamma 2 \text{var}(\eta_s)}$$

So, the equilibrium income tax rate is less than 1 and it decreases in the average level of δ .

⁵Given that we already proved that in this case $\tau_{wt} = 1$

5.3.3 HOW INEQUALITY AFFECTS REDISTRIBUTION

In this section, we compare two countries: one starts with a non equal distribution of capital (A), and the other with a perfectly equal distribution of capital (B). The reason that brings about positive redistribution in recent models with bequest is the decreasing marginal utility⁶. Instead we do not need a decreasing marginal utility of wealth, and the positive redistribution arises from the dislike for unfairness in society. As a consequence the more unequal country will not redistribute more. It is possible that the more equal country redistributes more, imposing a higher tax both on income and on bequest. The most common case that arises from our simulation, however, is that the more equal country starts with a higher bequest tax and a lower income tax than the other country. After some generation, usually, the two systems converge.

⁶See as example Farhi and Werning (2008) and Golosov et al. (2006).

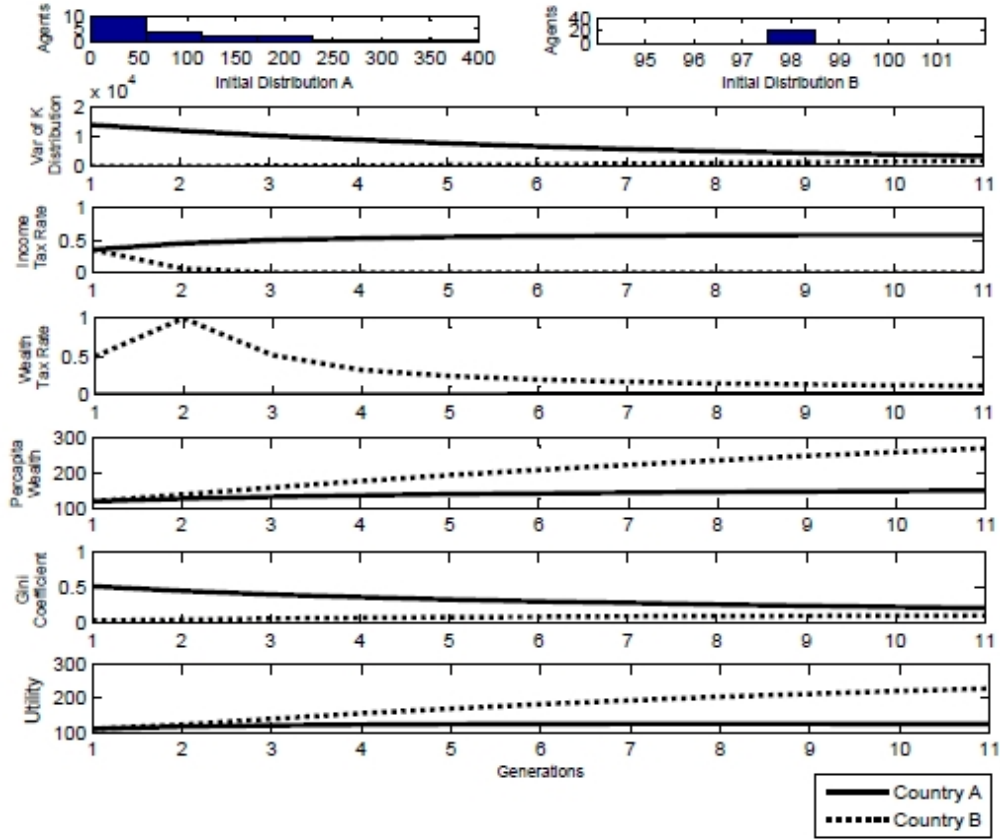


Figure 5.4: Inequality and Ideology

In figure 5.4 we have plotted also the evolution of the variance of capital. The two variances converge over generations. In this case the equal country redistributes more on bequest and less on income, showing a pattern with higher per capita utility and wealth and lower Gini coefficient.

5.3.4 COMPARISON BETWEEN INCOME TAX AND WEALTH TAX

We now analyse what happens if a country has to choose between imposing a tax rate on wealth or on income only. We suppose there are two countries A and B; country A can tax the income only and country B can tax only the net of income individual

wealth. As it is possible to notice from figure 5.5, the country that can impose a taxation on the bequest wealth shows better outcomes in terms of per-capita wealth, Gini coefficient, and aggregate utility.

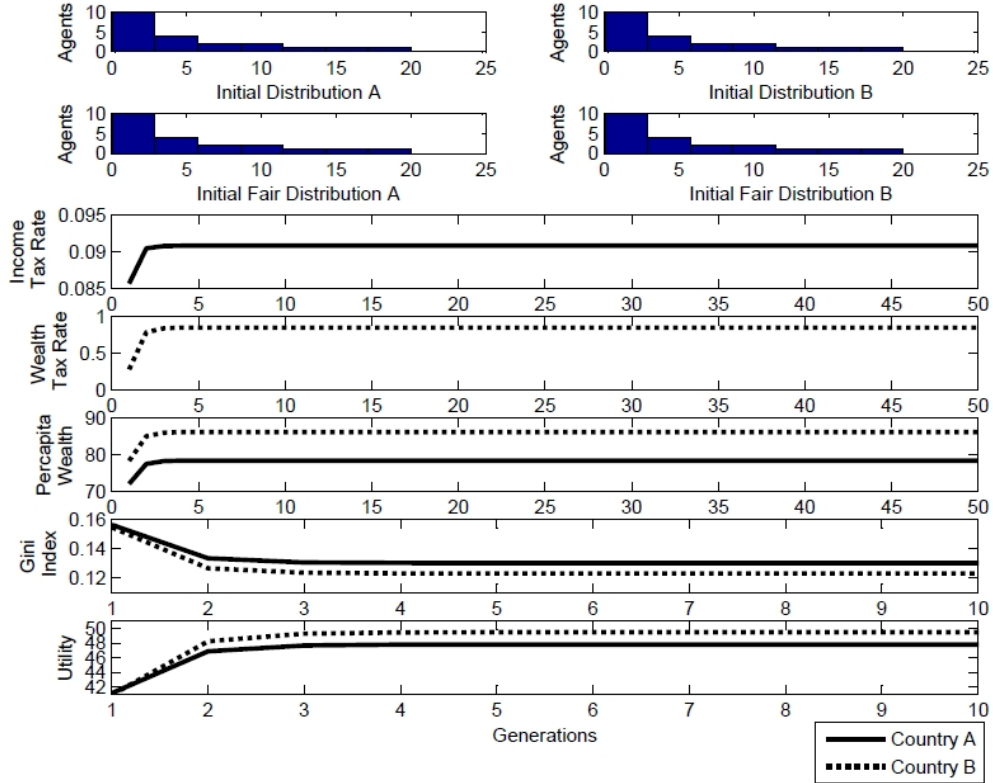


Figure 5.5: Income Tax and Wealth Tax

The results are quite robust, and consistent with Proposition 5.1 and 5.2. In the steady state the country that can impose a tax only on non-income-related wealth performs better or equally well than the country that can tax only income: in terms of per-capita wealth (in 100% of the simulations), in term of Gini (in 93% of the times), and in terms of aggregate utility (in 87% of the simulations).

5.3.5 ALTERNATIVE DEFINITIONS OF FAIRNESS

So far we have assumed that the individuals consider bequest as a fair component of wealth, for the part that depends on the ability and effort of parents. The fair capital in fact converges always to a distribution with positive variance. If we impose it to be equal to zero for one period, its variance will increase over the generations⁷. It is therefore interesting to see what happens if the individuals, regardless of its origin, considers any difference in the inherited capital endowment as undeserved, and hence unfair. To depict such a case, we rewrite the law of motion of fair capital as:

$$\widehat{k}_{it} = \alpha \int_0^1 \widehat{w}_{jt-1} dj = \alpha \int_0^1 \left[\delta_j (1 - \tau_{yt}) + \widehat{k}_{jt-1} \right] dj.$$

From a theoretical point of view the analysis is similar to one in chapter 3 ("Alternative definitions of fairness" section 3.2.3): with stochastic luck it would be possible to observe the case in which an individual has average luck $\eta_{it} = 0$, but her parent has positive luck $\eta_{it-1} > 0$. In this case, even if the child herself is not lucky, she might be considered lucky because her parent was. Moreover, if agents were unable to distinguish between the various origins of wealth, then the only possible fair bequest would be the average one $\widehat{k}_{t-1} = \int k_{jt-1} dj$: the individual might be lucky (and therefore inherit more than the average) because her parent was lucky $\eta_{it-1} > 0$ or because her parent had a high level of innate abilities A_{it-1} , or high endurance to effort β_{it-1} .

However, the similarities between this case and the one presented in Figure 3.4 end here. In fact, in this case are not the parents who decide whether what they leave to their children is fair, but is the subsequent generation (the children) who

⁷For a similar result, see Alesina et al (2009).

vote for the bequest. Theoretically is even stronger: individuals are born with different levels of capital, but cannot identify (or do not care about) the origins of that wealth, and consider every difference unfair. The resulting wealth tax would be different compared to the one in our benchmark case, although it is not possible to theoretically define with certainty if it would be higher or lower. The wealth tax in this case would be equal to:

$$\tau_{wt}^* = \min \left[\max \left(\frac{(1 - \tau_{yt}) [\text{cov}(\delta_s, k_{st-1})\tau_{yt} - \text{cov}(\eta_s, k_{st-1})]}{\text{var}(k_{st-1})}, 0 \right), 1 \right], \quad (5.23)$$

and the income tax:

$$\begin{aligned} \tau_{yt}^* = & 2[\text{var}(\delta_s)(1 - 2\tau_{yt}) ((1 - \tau_{yt})\tau_{yt} - \bar{k}_{st-1}) - \text{cov}(\delta_s, \eta_s)(1 - \tau_{yt})^2 \\ & - (1 - \tau_{yt})\text{var}(\eta_s) - \text{cov}(k_{st-1}, \delta_s)(1 - \tau_{wt})(1 - 2\tau_{yt}) \\ & - \text{cov}(k_{st-1}, \eta_s)(1 - \tau_{wt})] \end{aligned}$$

In figure 5.6 we show a representative figure with the comparison between our benchmark case (country A, solid line), and this different ideology that views other people initial wealth as equivalent to luck (country B, dashed line).

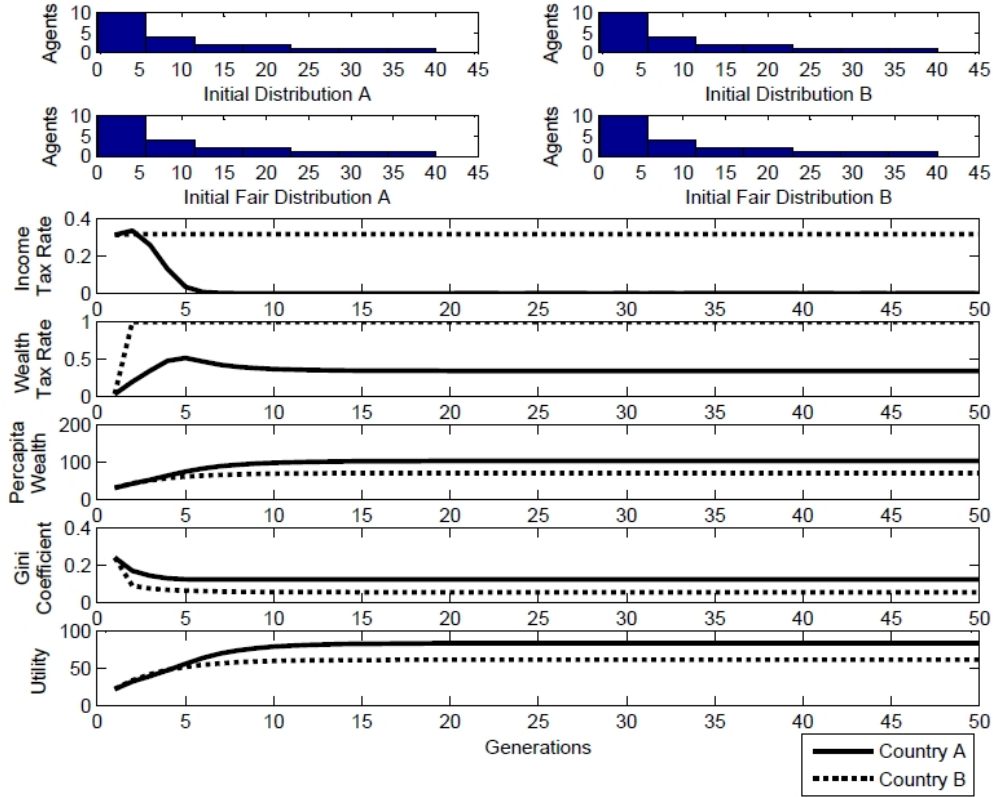


Figure 5.6: Different Definitions of Fairness

Country B redistributes more, imposing higher tax rate both on income and wealth. It will have a lower per-capita wealth, utility, and Gini coefficient. The results seems pretty robust: the benchmark country shows lower income tax rate (82% of the times), lower wealth tax rate (95% of the times), higher utility (93% of the times), and higher per-capita wealth (99% of the times).

5.4 CONCLUSIONS

This chapter originates from the work by Alesina and Angeletos (2005a), and Chapter 3, but departs from their framework by introducing a new way of thinking

about the wealth tax. We analysed the possible consequences of implementing a wealth tax and an income tax, where the latter is defined through a tax differential. This policy is studied within an environment in which individuals do not only care about the personal gain they can get from redistribution, but also about their ideal society and their concept of social justice. Our main analytical result, opposite to a classic result of the literature, is that it can be beneficial to tax mainly bequest-related wealth and avoid heavy taxes on income, as this policy can enhance effort and therefore the aggregate income. Moreover, given the dependence of the political preferences on the idea of fairness, the origin of wealth itself matters. If the differences in wealth derive from different levels of effort, individuals will be less keen to redistribute, while if the differences in wealth derive from an uneven distribution of luck, individuals will want to implement a higher redistribution.

Through numerical simulations we show how our model can be adapted to different situations: it is able to explain why more equal countries tend to implement higher wealth taxes, and how different ideologies can help shape policies.

In conclusion, this work adds an innovative point of view on the debate about the optimal wealth and capital tax; and at the same time integrates the decisions about wealth tax with ideology, and in particular the ideas of fairness.

CHAPTER 6

"BIG SOCIETY", REDISTRIBUTION AND VOLUNTEERING CAPITAL

6.1 INTRODUCTION

This chapter, co-authored with Koen P.R. Bartels and Guido Cozzi, studies the relation between redistribution and volunteering. Recently, the British coalition government launched its plan to create a ‘Big Society’ in which public activities and spending are ”rolled back” and citizens themselves take more responsibility in running public services. Ever since, commentators have vilified the plan for the dominance of rhetorical power over practical feasibility. More fundamentally, the Big Society plan has reinvigorated the debate on the relationship between government and society, or, more specifically, between public spending and volunteering. It is asserted that voluntary activity should, can, and will emerge as a perfect substitute for the welfare state. This hypothesis is based on the widely held belief that high government expenditure will impair volunteering because of a crowding out effect: an increase (decrease) in public expenditure brings about a significant decrease (increase) in individuals’ propensity to volunteer. Surprisingly enough, this belief is not backed up by solid theoretical foundations or empirical evidence. The goal of this chapter is to examine the theoretical and practical consistency of the perhaps too optimistic expectations of the Big Society plan.

For the first time to our knowledge, we offer an interdisciplinary approach merging economic and public administration points of view, to offer a complete

vision on the Big Society program. In particular, we focus on the effects of government expenditure on volunteering by employed individuals, a topic which, to our knowledge, has never been fully analyzed before. We combine an analytical model about volunteering by employed individuals, econometric analysis, and ground theory analysis on interviews, and reach to the path-breaking finding that the premises of Big Society are not sustainable: if we consider only employed individuals, there is actually no crowding out effect of government expenditure on volunteering, but, in fact a crowding in effect.

We focus our analysis on the working part of the population, because this is probably the most pivotal group of citizens when trying to stimulate volunteering. Employed individuals have to make a decision between allocating their time to working in the private market or to voluntary work, and are therefore not indifferent about whether the public good is produced through government or volunteering. Rather, their decision to volunteer is dependent on the level of government expenditure. Employed individuals are more likely to volunteer when public spending is higher.

This conclusion is reached through econometric analysis of two survey datasets (European Values Survey and British Household Panel Survey) and narrative analysis of in-depth interviews conducted with local volunteers and public professionals (between October and December 2009 in Glasgow). Our findings suggest that the decision of employed individuals to volunteer depends not only on government expenditure, but also on their personal abilities and existing volunteering capital. Lower public spending increases the probability of setbacks and frustrations for volunteers and decreases the availability of adequate support structures and professional skills. This lead us to conclude that less public spending reduces the likelihood of (successful) volunteering, but also that more public spending will not necessarily increase the voluntary activity. Rather, based on our model and

findings we recommend that exploration of government as a facilitator or enabler or volunteering capital might be the best direction for developing the literature on volunteering as well as the Big Society plan.

The chapter is organized as follows: Section 6.2 motivates the analysis and discusses the existing related literature. Section 6.3 presents and analyses the theoretical model. Section 6.4 carries out the econometric analysis of the testable predictions of our model. Section 6.5 discusses interviews we have undertaken on this issue. Section 6.6 concludes.

6.2 THE BIG SOCIETY: REINVIGORATING THE DEBATE ABOUT VOLUNTEERING

During the 2010 British elections, the financial crisis, and its impact on public expenditure, drove the welfare state to the top of the political agenda. The debate did not evolve around economic policy and the necessity of severe cutbacks *per se*, but more fundamentally reflected diverging ideologies about the relationship between state and society for delivering public services (Smith, 2010). While Labour sought to continue increasing public spending and taxation, the Conservatives proposed a radical turn to a small government and a “big society”. The latter vision came out on top, when the Conservatives formed a coalition government with the Liberal Democrats and put their plan for the Big Society in place. The main idea of the Big Society is that “rolling back big government” will create a climate in which “communities” take up the responsibility to run public services (Cabinet Office, 2010). By withdrawing public spending and agencies, it is claimed, local citizens will feel more motivated to volunteer for improving their communities.

Since the launch of the Big Society in May 2010, it has received a fair amount of scepticism and resentment. The Big Society was proposed to bring about

“a new era of people power” through policy measures such as providing volunteering training to local citizens, and especially young people, giving financial support to mutuals, cooperatives, charities and social enterprises to take over and run public services, and giving a general power of competence to local councils (Cabinet Office, 2010). However, initial concerns about whether it would actually provide anything new and useful were confirmed when Liverpool Council withdrew as one of the four pilot projects (BBC, 2011a). Criticism grew that the coalition government was only meeting its affectionate rhetoric with lukewarm initiatives and little concrete promises (Alcock, 2010). Furthermore, the Big Society has been condemned for being a symbolic device used to legitimize excessive cuts on public services and voluntary sector funding and consequently destroying the basic texture of voluntary programmes and activities (BBC, 2011b).

The crucial issue at stake here is whether less public spending will indeed lead more people into volunteering. It is openly questioned whether voluntary work would automatically emerge as a perfect substitute for government activity. In order for the Big Society to be successful, there should be a strong crowding out effect to counter the cuts in public spending: an increase (decrease) in public expenditure brings about a significant decrease (increase) in individuals’ propensity to volunteer. While academic and policy debates are divided between the conventional beliefs that the relationship between government expenditure and volunteering is either a matter of crowding out or crowding in, there is surprisingly little theoretical and empirical support for either position. Therefore, our focus in this chapter is to find out if a change in public spending affects individuals’ level of volunteering, and, if so, in which direction.

6.2.1 VOLUNTEERING BY EMPLOYED INDIVIDUALS

The innovation of our approach is to concentrate on the effect that the size of the government expenditure has on the active working population only. Below, we build a model in which active individuals have to decide how to allocate their time between working and volunteering. Contrary to the work by Duncan (1999) and Freeman (1997) we concentrate on time donation only, because we conceptualize volunteering as a social activity in which citizens are actually engaged in the delivery of public services. For example, the ambition of the Big Society is to “give citizens, communities and local government the power and information they need to come together, solve the problems they face and build the Britain they want” (Cabinet Office, 2010, p. 1).

Time donation by employed individuals is not a matter of a complete crowding out effect. In theoretical models about money or time donation with pure altruism, the crowding out effect emerges directly because volunteering is a substitute for government expenditure. What counts for individuals is that a public good exists and they are indifferent about whether it is produced through government activity or their own voluntary work. In an impure altruism framework, individuals receive utility from volunteering and are therefore not indifferent about the source of the public good. In this case, the crowding out effect can no longer be complete (Andreoni 2006). In our model, we consider how government expenditure and taxation influences the decision of employed individuals about their time allocation. Agents receive utility from the total amount of volunteering in the society as a form of public good as well as the result of their personal volunteering (rather than solely the hours spent volunteering *per se*).

Whether an employed individual will be willing and able to donate time to volunteering will also depend on her abilities. Citizens with more skills and experience are

more prone to volunteering as well as to being more effective in it. One of the main problems of voluntary work is getting other people than just ‘the usual suspects’ to participate (Barnes et al., 2007; Skidmore et al., 2006; Taylor et al., 2011). Lacking the ‘right’ abilities to volunteer in the ‘right’ place at the ‘right’ time can provide an entry barrier to citizens who work and therefore only have a limited amount of time available.

This effect can be mediated by the size of volunteering capital; i.e. the volunteering that is inherited from previous generations. We assume that the voluntary activities of previous generations do not die away but that at least some parts of it remain intact. For example, volunteering capital can take the form of a school built, an organization founded, handbooks with practical knowledge and know-how, or continuing volunteering programs. We note that volunteering capital is different from social capital: whereas social capital refers to the presence of social relationships that offer access to particular goods (Coleman, 1988; Portes, 1998; Edwards and Foley, 1998), volunteering does not necessarily require the presence of any social relationships to engage in the production of the public good. For example, if the residents of a social housing scheme are expected to keep the hallway of their building clean, they might decide to spend a certain amount of time each week on cleaning without having any social relationships with their neighbors that affects this decision¹.

The influence of government expenditure on employed individuals has been insufficiently explored. However, this relationship is fundamental to the widely held belief that public expenditure will impair volunteering. Therefore, below we build a model

¹Clearly social capital and volunteering capital can be mutually reinforcing. However, for the purposes of this model it is crucial to distinguish between both concepts rather than following this often prematurely made assumption.

that conceptualizes this link and takes into consideration the mediating effects of abilities and voluntary capital.

6.3 THE ECONOMY

We assume successive generations t of individuals, with each individual is indexed by $i \in [0, 1]$, and the total mass of individuals is normalized to 1. Population does not change over time and there is only one active individual per family. Agents live for one period and they are characterized by a certain degree of innate abilities $A_{it} > 0$ and capital inherited from the parent $k_{ipt-1} > 0$. Each individual allocates her working hours H_{it} between voluntary work h_{ivt} and market work h_{ipt} .

The utility function depends on private end-of-life consumption c_{it} and bequest k_{ipt} volunteering V_{it} ², public good G_t and disutility of work H_{it} :

$$u_{it} = \left[\frac{c_{it}^\alpha k_{ipt}^{1-\alpha}}{\alpha^\alpha (1-\alpha)^{1-\alpha}} \right]^e + V_{it}^e + \delta G_t^e - \frac{\psi H_{it}^2}{2} \quad (6.1)$$

where parameters satisfy $0 < \alpha < 1$, $0 < e < 1$, $0 < \delta < 1$, and $0 < \psi < 1$. Hence in this model we have both intragenerational altruism, expressed through volunteering, and intergenerational altruism, expressed through leaving bequest.

The labour supplied in the market, the private capital, and the productive abilities serve to produce the aggregate good in the economy:

$$X_{it} = A_{it} h_{ipt-1}^\beta k_{ipt}^{1-\beta}$$

²We consider volunteering only and not charitable contributions, as our intent is to focus the analysis on the Big Society. A possible criticism is that we should also consider money donations as they are substitutes. However, according the empirical study by Freeman (1997), there is evidence that time donations and money donations are complements in individual's preferences.

where $0 < \beta < 1$. The after-tax end of life wealth is given by:

$$W_{it} = (1 - \tau_t)X_{it} = (1 - \tau_t)A_{it}h_{ipt}^\beta k_{ipt-1}^{1-\beta}$$

At the end of their life individuals allocate their after-tax-wealth between consumption and bequest maximizing subutility:

$$\frac{c_{it}^\alpha k_{ipt}^{1-\alpha}}{\alpha^\alpha (1-\alpha)^{1-\alpha}}, \text{ which implies:}$$

$$c_{it} = (1 - \alpha)W_{it} \quad k_{ipt} = \alpha W_{it}.$$

Since $c_{it} + k_{ipt} = W_{it}$, the indirect utility function can be rewritten as:

$$u_{it} = W_{it}^e + V_{it}^e + \delta G_t^e - \frac{\psi H_{it}^2}{2} \quad (6.2)$$

Analyzing employed individuals only, we rule out the possibility that the motivation for volunteering is to invest in human capital in order to find a job (Day and Devlin, 1998). We assume that volunteering is motivated by warm glow altruism. Each person's volunteering impact depends on the hours spent volunteering, her productive abilities³, and the aggregate volunteering capital \bar{k}_{vt-1} :

$$V_{it} = A_{it}h_{ivt}^\beta \bar{k}_{vt-1}^{1-\beta} \quad (6.3)$$

The volunteering capital evolves according to:

³In this section we assume that private sector abilities and volunteering abilities are perfectly correlated. In section 4.3.2, when considering non-active individuals, we will drop this assumption.

$$\bar{k}_{vt} = (1 - \rho)\bar{k}_{vt-1} + \int_0^1 h_{vjt} A_{jt} dj + \bar{\theta}$$

ρ represents the natural decay rate of the volunteering capital lost across generations. A certain degree of volunteering capital $\bar{\theta}$ is independent from the volunteering as it is guaranteed from the market interactions. In fact, we think it realistic to assume that even if initial volunteering capital were zero, the market would still harbour a minimum possibility for voluntary activity to emerge. That is, even in the extreme case in which any history of volunteering or social relationships was absent, individuals could make volunteering arise from the very basic social contact that is involved even in market activities.

The public good can be provided either using government revenues or volunteering:

$$G_t = \tau_t \int_0^1 A_{jt} h_{jpt}^\beta k_{jpt-1}^{1-\beta} dj + \bar{k}_{vt-1}^{1-\beta} \int_0^1 A_{jt} h_{jvt}^\beta dj$$

Assuming that the abilities are stationary, in steady state each individual's capital would converge to:

$$k_{ip} = [\alpha(1 - \tau)A_i]^{\frac{1}{\beta}} h_{ip}.$$

6.3.1 OPTIMAL TIME ALLOCATION

We want to study the optimal allocation of time between working and volunteering. The first order conditions are:

$$\begin{aligned}
\frac{\partial u_{it}}{\partial h_{ip}} &= e\beta W_p^{e-1}(1-\tau)A_{it}k_{ipt-1}^{1-\beta}h_{ipt}^{\beta-1} - \psi(h_{ivt} + h_{ipt}) \\
&= e\beta \left((1-\tau_t)A_{it}k_{ipt-1}^{1-\beta} \right)^e h_{ipt}^{e\beta-1} - \psi(h_{ivt} + h_{ipt}) \\
&= 0
\end{aligned} \tag{6.4}$$

and

$$\begin{aligned}
\frac{\partial u_{it}}{\partial h_{ivt}} &= e\beta V_{it}^{e-1}A_{it}\bar{k}_{vt-1}^{1-\beta}h_{ipt}^{\beta-1} - \psi(h_{ivt} + h_{ipt}) \\
&= e \left(A_{it}\bar{k}_{vt-1}^{1-\beta} \right)^e h_{ivt}^{e\beta-1} - \psi(h_{ivt} + h_{ipt}) \\
&= 0
\end{aligned} \tag{6.5}$$

from which we obtain:

$$\left(\frac{h_{ipt}}{h_{ivt}} \right)^{e\beta-1} = \left(\frac{\bar{k}_{vt-1}^\beta}{(1-\tau)k_{ipt-1}^{1-\beta}} \right)^e$$

and therefore

$$h_{ipt} = \left(\frac{(1-\tau)k_{ipt-1}^{1-\beta}}{\bar{k}_{vt-1}^\beta} \right)^{\frac{\varepsilon}{1-e\beta}} h_{ivt} \tag{6.6}$$

Substituting (6.6) in (6.5) we can write:

$$\begin{aligned}
e \left(A_{it}\bar{k}_{vt-1}^{1-\beta} \right)^e h_{ivt}^{e\beta-1} - \psi \left[h_{ivt} + \left(\frac{(1-\tau)k_{ipt-1}^{1-\beta}}{\bar{k}_{vt-1}^\beta} \right)^{\frac{\varepsilon}{1-e\beta}} h_{ivt} \right] &= 0 \\
h_{ivt}^{e\beta-2} - \frac{\psi}{e \left(A_{it}\bar{k}_{vt-1}^{1-\beta} \right)^e} \left[1 + \left(\frac{(1-\tau)k_{ipt-1}^{1-\beta}}{\bar{k}_{vt-1}^\beta} \right)^{\frac{\varepsilon}{1-e\beta}} \right] &= 0
\end{aligned}$$

The optimal amount of voluntary work:

$$\begin{aligned}
h_{ivt}^* &= \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} \left(\frac{\left(A_{it} \bar{k}_{vt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{\left(\left((1-\tau) A_{it} k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + (A_{it} \bar{k}_{vt-1})^{\frac{e}{1-e\beta}} \right)^{\frac{1}{2-e\beta}}} \right) \\
&= \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} A_{it}^{\frac{e}{2-e\beta}} \left(\frac{\bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}}}{\left(\left((1-\tau) k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)^{\frac{1}{2-e\beta}}} \right) \quad (6.7)
\end{aligned}$$

Substituting (6.7) in (6.6) we obtain the optimal market working hours:

$$\begin{aligned}
h_{ipt}^* &= \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} \left(\frac{\left((1-\tau) A_{it} k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{\left(\left((1-\tau) A_{it} k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + (A_{it} \bar{k}_{vt-1})^{\frac{e}{1-e\beta}} \right)^{\frac{1}{2-e\beta}}} \right) \\
&= \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} A_{it}^{\frac{e}{2-e\beta}} \left(\frac{\left((1-\tau) k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{\left(\left((1-\tau) k_{ipt}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)^{\frac{1}{2-e\beta}}} \right)
\end{aligned}$$

Higher innate ability A_{jt} makes individual j more willing to both work in the market and volunteer. A change in the abilities changes each individual's optimal time allocation in the same proportion no matter the personal ratio of private capital to volunteering capital.

However a shock on the economy that cuts both the privately owned capital and the volunteering capital in the same proportion will not be neutral. Imagine a shock that affect all the capital in a society, such as a stock market shock. The smaller the ratio of private capital to volunteering capital for an individual the more a crisis that cuts of capital in the society will affect her volunteering. In other words, the poorer

is an individual the more her volunteering is going to be affected by an economic crisis.

Also the taxation influences the decisions of timing allocation between volunteering and working in the market. In particular:

Proposition 6.1 *An increase (decrease) in τ_t brings about an increase (decrease) in the optimal volunteering hours h_{ivt}^* and a decrease (increase) in the optimal working hours for each individual $i \in [0, 1]$.*

Proof Taking the first derivative of h_{ivt}^* with respect to the taxation we obtain:

$$\frac{\partial h_{ivt}^*}{\partial \tau_t} = \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} A_{it}^{\frac{e}{2-e\beta}} \frac{e \left(A_{it} \bar{k}_{vt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}} \left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e-1+e\beta}{1-e\beta}} k_{ipt-1}^{1-\beta}}{(2-e\beta)(1-e\beta) \left(\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)^{\frac{3-e\beta}{2-e\beta}}} \geq 0$$

The first derivative of h_{ipt}^* with respect to τ_t is:

$$\begin{aligned} \frac{\partial h_{ipt}^*}{\partial \tau_t} = & \left(\frac{e}{\psi} \right)^{\frac{1}{2-e\beta}} A_{it}^{\frac{e}{2-e\beta}} \frac{e}{1-e\beta} \left(\frac{\left((1-\tau) k_{ipt}^{1-\beta} \right)^{\frac{e-1+e\beta}{1-e\beta}} k_{ipt}^{1-\beta}}{\left(\bar{k}_{vt-1}^{\frac{e}{1-e}} + (1-\tau_t)^{\frac{e}{1-e}} \right)^{\frac{1}{2-e}}} \right) \times \\ & \left(\frac{\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{(2-e\beta) \left(\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)} - 1 \right) \end{aligned}$$

Which is negative since:

$$0 \leq \frac{\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{(2-e\beta) \left(\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)} \leq 1 \quad (6.8)$$

QED.

Proposition 6.1 states that a contraction of the welfare state does not cause an increase in the voluntary labour supply, but on the contrary it provokes a decrease in it, at the same time an increase in the amount of hours worked in the market. A decrease in the tax rate τ reduces the disincentive on private work and therefore individuals decide to spend more hours working in the market and less hours volunteering. An increase in the tax rate works in the opposite way. The result that a tax increase can enhance volunteering should be quite a general result, as long as all goods are normal, as in any additively separable utility function.

Proposition 6.1 does not directly imply that an increase in taxation brings about an increase in the public good *tout court*. The disincentive effect of taxation on private labour supply could be so strong that could cause the government revenues to decrease. In this way the increase in public good caused by the increase in the volunteering could be compensated and even offset by the decrease in the worked hours. Proposition 6.2 provides the conditions that guarantees that an increase in taxation generates an increase in the public good provision.

Proposition 6.2 *If $\frac{\tau_t}{1-\tau_t} < \frac{1-e\beta}{e}$ an increase in the taxation causes a net increase in the public good provision in both the government component and the voluntary one.*

Proof. It is necessary to prove that if conditions in the Proposition 6.2 holds, than the public good G_t increases in both factors $\tau_t \int_0^1 A_{jt} h_{jpt}^\beta k_{jpt-1}^{1-\beta} dj$ and $\bar{k}_{vt-1}^{1-\beta} \int_0^1 A_{jt} h_{jvt}^\beta dj$ as τ_t increases. From Proposition 6.1 we know that an increase in τ_t will cause an increase in h_{ivt}^* . We need to find the condition under which an increase in τ_t brings an increase in the optimal amount of government revenues. The elasticity of the optimal work supply to the taxation is:

$$\eta_{h_p, \tau} = \frac{\tau_t}{(1-\tau_t)} \frac{e}{(1-e\beta)} \left(\frac{\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}}}{(2-e\beta) \left(\left((1-\tau) k_{ipt-1}^{1-\beta} \right)^{\frac{e}{1-e\beta}} + \bar{k}_{vt-1}^{\frac{(1-\beta)e}{1-e\beta}} \right)} - 1 \right)$$

if $\frac{\tau_t}{1-\tau_t} < \frac{1-e\beta}{e}$ the elasticity is $0 < \eta_{h_p, \tau} < 1$. Therefore, as long as $\frac{\tau_t}{1-\tau_t} < \frac{1-e\beta}{e}$ the work supply is inelastic. An increase (decrease) in τ_t translate in a net increase of the public good supply also in the government part of the public good. QED.

In Figure 6.1 we illustrate a representative numerical example, showing how the equilibrium amount of average working hours, volunteering, public good production, and utility respond to changes in the tax rate:

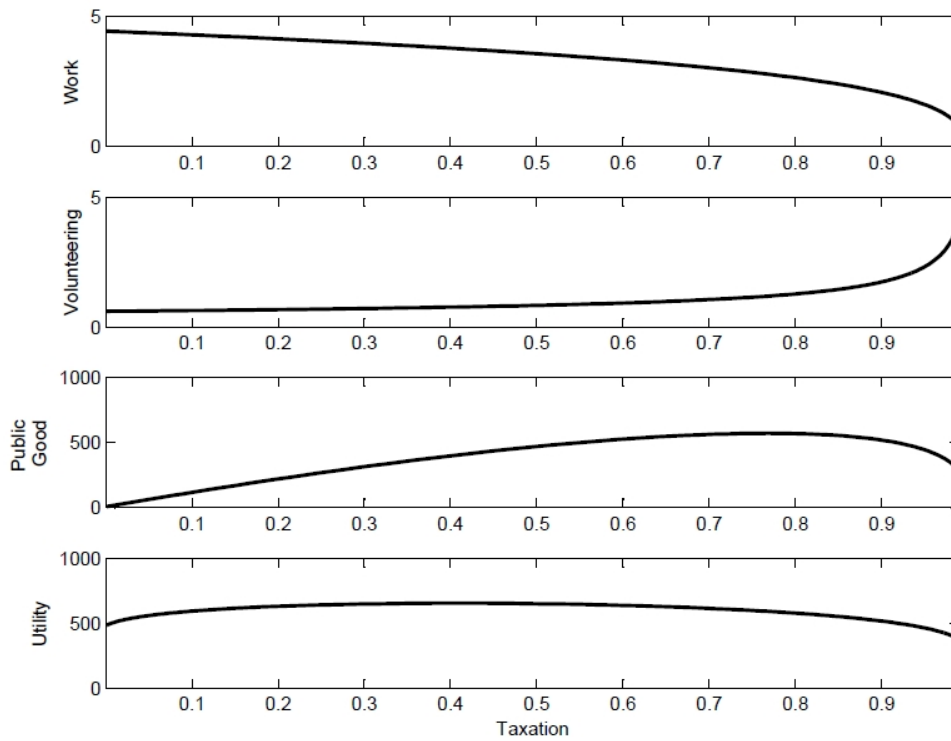


Figure 6.1: Illustration of the Model

It is worthwhile remarking that this kind of diagram is extremely robust over a wide range of possible parameter values, and it has been provided here just to give the reader a visual illustration of the results we have already proved analytically.

6.3.2 NON-ACTIVE AGENTS

So far, we have analysed the response to taxation of employed individuals only. What would the response of individuals who do not work be? Let us generalize this framework by assuming that there are two different types of abilities in the model: A_{itP} for the production of the good X_{it} and A_{itV} for the provision the volunteering.

Non-productive individual j can be viewed as characterized by a negative shock on the productive abilities, so that $A_{jpt} = 0$, while $A_{jtV} > 0$. Her indirect utility function then becomes:

$$u_{jt} = V_{jt}^e + \delta G_t^e - \frac{\psi H_{jt}^2}{2} \quad (6.9)$$

The optimal private work is $h_{jpt}^* = 0$. The FOC relative to the hours spent volunteering are:

$$\frac{\partial u_{it}}{\partial h_{ivt}} = e\beta V_{it}^{e-1} A_{it} \bar{k}_{vt-1}^{-1-\beta} h_{ipt}^{\beta-1} - \psi h_{ivt} \quad (6.10)$$

$$\begin{aligned} &= e \left(A_{it} \bar{k}_{vt-1}^{-1-\beta} \right)^e h_{ivt}^{e\beta-2} - \psi \\ &= 0 \end{aligned} \quad (6.11)$$

In this case the optimal amount of hours spent volunteering does not depend on tax rates:

$$h_{ivt}^* = \left(\frac{e}{\psi} \left(A_{it} \bar{k}_{vt-1}^{-1-\beta} \right)^e \right)^{\frac{1}{2-e\beta}}$$

Therefore, assuming that there is a strong proportion of non-employed individuals that volunteer, our model is consistent with the empirical results by Van Oorschot and Arts (2005), who do not find evidence on the hypothesis of crowding out or crowding in.

6.4 GOVERNMENT EXPENDITURE, ABILITIES, AND VOLUNTEERING: ECONOMETRIC ANALYSIS

We used two different datasets to test the relationship between government expenditure, abilities and volunteering for employed individuals. The first dataset contains the intersection of the OECD countries and the countries included in the European Values Survey fourth wave (2008), for a total of 24,082 observations from 16 countries. The second dataset is the British Household Panel Survey (BHPS), which contains survey data about the UK from 1991 to 2007, for a total of 140,850 observations. In these datasets, we have analysed the effect of the General Government Expenditure and personal education on the binary variable of doing unpaid work⁴ for any association concerned with, among others, environment, professional activities, youth work, sports/recreation, women activities, peace, health. In both datasets we have found a significant positive relationship between employed individuals' decision to volunteer and both the total government expenditure and individuals' abilities.

In order to study how the size of the welfare state influences the level of volunteering, we needed to analyse how expansions or contractions of the Governments Expenditure⁵ cause changes in the probability for each individual to volunteer.

In the first dataset, we have reparametrized the answer about the volunteering, so that 0 means that the respondent does not do any voluntary work and 1

⁴Although it might be interesting to analyse the change in the hours dedicated to volunteering, we are interested mainly in studying the participation rate to volunteering, and therefore the best variable to use is the binary variable that describes if individuals do some voluntary work or not.

⁵Hackl *et al.* (2009) argue that in order to analyze crowding in or crowding out it is necessary to consider the Social Expenditure instead of the General Government Expenditure. To test the model, we nevertheless decided to focus on the latter, because Social Expenditure data does not cover the phenomenon of volunteering in its entirety. Volunteering data also includes the decisions to participate in activities that are not (directly) related to Social Expenditure. Data on Social Expenditure only take into account benefits such as pensions, disability pensions, family allowances etc., and do not cover services to citizens (for example education, environment, or minority group rights).

means that the respondent does voluntary work. The General Government Expenditure is taken from the OECD dataset and for each country is calculated as the ratio between General Government Expenditure and GDP in 2008. Education is measured by the number of years of education, which we have used as a proxy for abilities. For each country, we consider only the decisions by employed individuals. Since we are dealing with a binary dependent variable we report the results of our Logit estimations, but using Probit would not change our qualitative results. The connection between the government expenditure and volunteering among workers seems really robust, whether education is introduced or not.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Government Expenditure	1.513626	0.338960	4.465502	0.0000
Education	0.230795	0.016481	14.00331	0.0000

Table 6.1: Europe

The results of the model about the dependence of the volunteering on the size of the welfare state and personal abilities are confirmed by the data about Europe. From Table 6.1 we can see that General Government Expenditure and Education are both strongly significant. The coefficient of Government Expenditure is positive and bigger than one (1.513626), which supports the hypothesis that an increase in public expenditure brings about an increase of volunteering in society. The coefficient of the education is positive (.230795), which confirms that an increase in the abilities increases the probability of volunteering.

For the second dataset, the British Household Panel Survey from 1991 to 2007, we have repeated this analysis, with the difference that this time personal income was used as a substitute for abilities. The dependent variable is also slightly different

from the one of the European Values Survey, as it responds to the question about the respondent being active in one or more organizations such as political party, trade union, environmental group, parents association, tenant association, religious group, voluntary group, community group, sport club, in women institute, in women group or in other group. Also in this case we have excluded the non-employed individuals, obtaining the following results:

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Government Expenditure	1.642890	0.374590	4.385837	0.0000
Income	1.66E-05	7.10E-07	23.44610	0.0000

Table 6.2: UK a

While it could have been the case that British citizens react in a different way from individuals living in Continental Europe, also from the BHPS dataset we found strong evidence to confirm that the probability of volunteering, for employed individuals, is positively related to Government Expenditure and abilities. In the UK case the Government Expenditure is significant, positive, and bigger than 1, showing a coefficient remarkably similar to that obtained from the analysis of the European dataset (1.642890). Also income, used as a proxy for abilities, is positive and significant. The fact that the coefficient is small depends on the magnitude of the income related to the dummy variable of doing voluntary work or not.

The BHPS also provides data to test the time allocation assumption, i.e. that an increase in the hours worked in the market implies a decrease of the hours spent volunteering. Therefore, in Table 6.3 we insert the data about the amount of hours worked per week in the regression.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Government Expenditure	1.564496	0.375054	4.171384	0.0000
Income	2.14E-05	8.15E-07	26.22122	0.0000
Hours Worked per Week	-0.009851	0.000769	-12.81859	0.0000

Table 6.3: UK b

It appears that individuals indeed have to allocate their time between volunteering and working in the market. Table 6.3 shows that the variable Hours Worked Per Week is significant and negative, and that, at least for the UK, the main assumption about time allocation is supported by the data.

In sum, we have proved that the data are consistent with the predictions of the theoretical model about the dependence of volunteering on the size of the welfare state and personal abilities. These findings support the view that government expenditure has a positive effect on volunteering: a decrease in public spending decreases the probability that employed individuals decide to volunteer.

6.5 VOLUNTEERING CAPITAL AND PERSONAL MOTIVATIONS: NARRATIVE ANALYSIS

While our econometric findings indicate that abilities also influence this volunteering decision, in our datasets there were no data available to support the influence of our theoretical notion of volunteering capital, nor to understand the relationship between these variables. However, the analysis of this section may help to cast more lights on these qualitative relationships, by explicating how in practice the presence of volunteering capital can affect the decision of employed individuals to volunteer.

The narrative data consists of 19 interviews conducted between October and December 2009 in Glasgow (UK) part of a comparative project on community participation in deprived neighbourhoods in several European countries. The interviews were conducted with 7 active residents of the area Pollokshields Southside Central, 7 public professionals working for various agencies delivering public services in this area, and 5 public professionals working in support of Glasgow City Council in this and several other areas of the city. The respondents were asked about their practices, everyday ideas, choices and actions, with regards to community participation, which were transcribed and systematically analysed by means of a set of rigorous methods and techniques to inductively develop an analytical understanding of what is going on in the empirical data (Charmaz, 2006).

The goal was to establish what these people were actually trying to communicate when they said or did something, and what communicative barriers prevented them from constructive collaboration. For this purpose, the interviews were approached as narratives: a range of ‘stories’ a person tells about real or imagined situations that wittingly or unwittingly enables this person to pinpoint what happened, make sense of these happenings, and express his/her evaluation of them. By reconstructing and confronting the narratives of different people, it becomes possible to see the assumptions, beliefs, and emotions that underlie their daily experiences and identify broader behavioral patterns and tensions. While the overall research was much broader than voluntary activity alone, the narratives analysis revealed two dominant narratives with regards to citizens’ motivations to participate and the importance of voluntary capital.

The first narrative is ‘work in progress’, which signifies that volunteering is an ongoing, complex, and demanding process. The following quote of a public professional working in support of the Council is illustrative:

".. part of the process is ... taking the message ... to ... community councils, ... area committees, you've got tenants and residents associations, youth groups, you know Basically if you identify where they are, and who they are, then making contact with them, going along and making a presentation.... And you might go to ten of those, you know, and for every ten you might get one ... who is willing to come along, and they might just come along to a meeting, decide it's not for them and then disappear again. But that's again what I say about the nature of it and it's about continuing to go out and spread the word and networking with partners to make sure that ... they're spreading the word So, but it's just an ongoing piece of work ... that doesn't stop So very much work in progress..." (Respondent 3)

The respondent indicates that the daily support for voluntary work is very time, energy, and resource intensive, because there is no stopping rule to recruiting volunteers. It is about continuing to go out to meet new people, making contact, convincing them to come along, providing them with adequate training, and keeping them on board. In order to secure a continuity of services with such a high turnover of volunteers, there is a strong need for sufficient support structures and professional skills (see also Taylor et al., 2011, p. 9; Skidmore et al., 2006). Notice that the respondent only talks here about going out to people who are already part of a group that does voluntary work. The experience is that for new citizens to volunteer the process is even much more a 'work in progress'.

The second narrative is 'making a difference', which denotes that citizens start to volunteer because they are committed to solving particular problems, but struggle with a lot of setbacks preventing actually making a difference to their community.

"...when I got involved with the Community Council ... a particular person would lead on a particular project and the rest would fall in line and support that.

... It worked really well and it was mutually beneficial ..., and then you see the effects in people's day-to-day lives. ... I don't look for feedback through, you know, strategic bodies who are going to make an assessment of something has been a success or not, I get my feedback through my neighbors in my community and when I see things happening. ... I mean, ... I had a big community event in the summer..., and I had been asked at this event if I would do a survey for the Community Council.... I said 'Of course, that's fine, I'll do it', even though I really didn't have time I emailed every single member in my Community Council ... and I said 'We're having this big event, it would be really lovely if you would ... come along and help me ... and have fun'. Not one ... Community Councillor came. ... That's when I knew that ... it wasn't really functioning." (Respondent 7)

The respondent explains that her main motivation for volunteering is seeing problems being solved in her direct living environment. However, there are often a lot of setbacks that cause deep frustration. Starting to volunteer, and keeping on doing so, therefore requires a very strong commitment and well-developed skills. This implies that citizens with higher abilities will be more likely to volunteer, as having less skills and experience can either prevent a person from deciding to start volunteering or to give up more quickly. The decision to volunteer is therefore mediated by a person's abilities to 'make a difference'.

Taken together, these narratives clarify why the decision of an employed individual to volunteer depends on their abilities and voluntary capital: she is less likely to allocate time to volunteering when she lacks the abilities to get involved in voluntary work and effectively participate in it, and there is insufficient voluntary capital to counter the inevitable setbacks and frustrations. At a deeper level, these findings suggest that government expenditure is a crucial variable for volunteering: less public spending increases the probability of setbacks and frustration

and decreases the availability of adequate support structures and professional skills. Thus, this narrative analysis has further confirmed the model and the results of the econometric analysis, as well as provided some deeper insight into the relationships between government expenditure, abilities, voluntary capital, and volunteering.

6.6 CONCLUSIONS

We have found that, in contrast to common beliefs, more government expenditure actually increases the probability of volunteering for employed individuals: less public spending reduces the likelihood of (successful) volunteering. This finding should not be interpreted as (political) argument in favour of ‘Big Government’ and against ‘Big Society’. The point is not that increasing public spending will automatically lead more citizens to volunteer. In fact, after a certain “tipping point” (see figure 6.1) further increasing the government expenditure will lead the overall public good to decrease. Therefore, based on our model and findings we want to suggest that government expenditure has to be sufficient to maintain volunteering capital and facilitate volunteering.

From this perspective, the government fulfils a different role in society than merely providing public agencies and spending to directly or indirectly deliver services. Rather, the government acts as facilitator, or enabler, that does not decide for, but with volunteers what the level of public spending should be and how this could maintain and improve volunteering capital. It is not simply a matter of a government that is present or withdraws; it requires a government that places itself next to voluntary workers and organizations to cooperatively make volunteering work. This would be a government that is not steering but serving (Denhardt & Denhardt, 2000; King & Stivers, 1998). In effect, this requires, for example for the Big Society

plan, that the government should not be “rolling back”, nor simply “rolling in”, but rather “rolling out the red carpet”.

Many factors were already known to affect levels of voluntary activity, but to our surprise the relationship between public spending and volunteering had great lacunae, which were filled by the widely held belief in the existence of a crowding out effect. With this chapter we have sought to assess the validity of this popular assumption by developing a theoretical model about the influence of government expenditure on the decision of employed individuals to allocate their time to voluntary work or not. Our model and findings provide strong foundations for the thesis that government expenditure leads to an increase of voluntary activity. In the realistic data for the UK and for Europe, higher public spending increases the probability that the working part of the population will decide to volunteer. What we can safely learn from our analysis is not that the government expenditure should be increased, but rather than stepping back, the government should position itself as a facilitator, or enabler, of volunteering capital.

Admitted, this is a somewhat speculative conclusion for which our model and findings do not provide any concrete indications of how to put it into practice. We provide only a preliminary analysis of the relationship between government expenditure and volunteering and a prospective view on the effects we might expect from the Big Society plan. While it might be objected that no valid conclusions can be drawn about the effects of the Big Society plan without analysing data following its launch in time, we concur that our test of the main belief underlying this policy provides valuable insights into the likelihood of its success or failure as well as helpful recommendations about the direction in which it could be amended. Our findings lead us to believe that more specific recommendations could be formulated by further research in the ways government expenditure interacts with the personal abilities of individuals and influences the volunteering capital. A main limitation of our model

is that it does not allow for such interactions. However, in its current form it does firmly establish that government expenditure has a positive effect on the decision to volunteer by employed individuals. Moreover, we have only considered public expenditure as whole, while it might be rewarding to analyse how each specific component influences the relative segment of volunteering. This will likely be the focus of a future research.

CHAPTER 7

CONCLUSIONS

Empirical evidence¹ has proved the existence of important relationships between non-economic variables, direct and indirect redistribution, and economic growth. However, the literature has not been able to properly explain this connection. The aim of this thesis is to analyse the role of altruism and ideology, in particular referring to the ideas of fairness. We study how these non-economic variables affect individuals' preferences for voting and their decisions regarding voluntary work. In the four essays of this thesis the common feature is that individuals do care about others as well as their personal gain. Each essay has explored different aspects of altruism and ideology in order to support the overall conclusion that these factors cannot be neglected in the analysis of political economic processes.

The first essay focuses on the relation between the perception of individuals about social justice and their preferences for redistribution. It shows that the evolution of political ideology regarding the fairness of the constellation of income and wealth in society can generate economic and political persistence in inequality, redistribution, and growth. According to our model, ideology does not entail cognitive distortions of reality, but shapes the moral judgement of what wealth distribution would be fair, and, moreover, internalizes into people's preferences the degree to which they become unhappy from the distance between the current wealth distribution and the wealth distribution they consider fair. It is important to remark that all individuals

¹See Alesina and Glaeser (2004).

are perfectly rational and can directly observe the achievement of each social group, the level of effort they have made, and the external factors ("luck" or government taxes and transfers) that have determined their parent's wealth. Since we adopt an overlapping generations structure, it makes sense to model that over a relatively long time an unbiased assessment can be made about how strongly people have contributed to their family's enrichment through their life-time work commitment. We show that differences in the initial view of what is fair and unfair can affect otherwise identical economies for a potentially long sequence of generations. This suggests that relatively short periods of unfair treatment of family wealth can shape the subsequent economic performance of the economy quite strongly.

We also compare economies characterized by different cultures, in so far as we can define culture as a network of meanings that allows people to form a moral judgement about their society. We show that in our model a poor country would grow less than it could because the voters perceive a high relative importance of "luck" in their economic success, thereby judging the end-of-life wealth distribution quite unfair, and thus supporting high redistributive policies. This, in the expectations of rational economic individuals, discourages effort and discourages income and capital accumulation. We also analyse the reaction to shocks to wealth with the result that individuals react differently according to how shocks affect their perception of fairness and recreate a hump-shaped effect of the higher income. In sum, the first chapter shows how ideology and redistribution evolve over time and affect economic growth and equality.

The second essay continues the study of the role of ideologies, but introduces endogenous abilities and public education to the analysis. This has two implications. First, when fairness is considered as a part of individuals' preferences, it influences their voting behavior. Voters are not simply selfish, but care about social justice. Public education, secondly, diminishes income differences for future generations.

This second essay demonstrates that fairness and public education play a crucial role in the determination of fiscal policy. Consistently with the first essay we find that the more individuals believe that the willingness to work, rather than luck, determines income, the less they will be willing to redistribute. On the contrary, a society where poorer people are considered unlucky will be well-disposed to redistribute more wealth.

Although we allow for an extension with transfers, we mainly investigate societies in which the government expenditure is allocated between the public good and public education. We perform a numerical experiment to analyse the interaction between ideology and public education. Different types of ideology influence in different ways the government expenditure and therefore public education. If agents believe public education to be fair, they will vote for a different level of redistribution, which in turn leads to higher public education, economic growth, and lower inequality. Moreover, the more agents have strict ideas about fairness, the higher the government expenditure is. A certain degree of taxation has a positive effect on abilities and therefore on the per capita income and equality. However, an excessively high taxation can impair economic growth because of the disincentive effect of taxes on effort. In this way, societies can be trapped in ideology traps and have subsistent low public expenditure. We also analyse the effect of different initial levels of public schooling, showing that higher levels of public schooling are associated with higher equality and income, leading to higher economic growth for several generations.

The third essay deals with interactions between ideology and wealth tax. We introduce a new way of thinking about the wealth tax by analysing the possibility of implementing a wealth tax and an income tax, where the latter is defined through a tax differential. In order to avoid double counting, in fact, we subtract the income tax from the wealth tax; this allows individuals to vote for their preferred policy distinguishing between the wealth that derives from their work and the wealth that

derives from the capital they inherited from their parent, imposing two different tax rates. This innovative welfare scheme is implemented in an environment in which individuals also care about their ideal society and their concept of social justice.

The main result, that we find both analytically and numerically, is opposite to the classic result of the literature: taxing mainly bequest-related wealth and avoiding heavy taxes on income can be growth enhancing and can reduce inequality. Moreover, the origin of wealth itself matters: if the differences in wealth derive from various levels of effort, individuals will decide to impose a lower taxation as they believe the distribution of wealth to be fair. On the other side, if the differences in wealth come from an uneven distribution of luck, individuals will believe the distribution of wealth to be unfair and vote for a higher level of redistribution. The third essay thus adds an innovative point of view on the debate about the optimal wealth and capital tax by studying the possibility of a tax differential and linking it to ideology and in particular the idea of fairness.

The fourth essay conceptualizes and tests the relationship between fiscal policy and volunteering, based on the current British Government's ambitions for creating the "Big Society". The "Big Society" policy is based on the idea that granting more freedom to local communities and volunteers will compensate for a withdrawal of public agencies and spending. This essay seeks to answer the question how public spending affects the individual decision to volunteer. In order to do this, our methodology consists of three steps. The first step is to develop a simple theoretical model that predicts this relationship by making two important innovations: focusing on employed agents and "warm glow altruism". Up to now, the relationship between public spending and volunteering has only been studied for the entire population or specific groups such as retired people or young people. However, employed agents do not face the same time allocation constraint between working, volunteering, and leisure as retired or unemployed individuals. The main result of the model is that

public spending affects the decision to volunteer, but not in the way as is commonly assumed. More specifically, a decrease in the public expenditure brings about a decrease in volunteering. Moreover, according to the results, the decision to volunteer is also positively influenced by individual abilities.

The second step is to test the predictions of the model through an econometric analysis of two survey data sets, finding a significant positive relationship between volunteering, government expenditure and abilities. The third and final step is to analyse the relationship between voting, abilities and volunteering qualitatively. A narrative analysis reveals that volunteering is an ongoing work in progress in which it is difficult to make a difference. Less public expenditure can increase the probabilities of setbacks and decrease the funding available for the necessary support structures and professionals. Moreover, low abilities increase the difficulties for an individual to participate. In conclusion, our results suggest that volunteering, by individuals from the active working population, declines when government intervention is decreased. This implies that the crowding out hypothesis and the main assumption of the Big Society policy are not sustainable.

In conclusion, the main insight from the thesis is that ideology and altruism influence individuals' behavior and should be taken into consideration when analysing political processes and preferences for taxation. However, there are aspects that should be further explored. It could be interesting to study optimal non-linear taxation in a multidimensional environment, with preferences also defined for social justice and fairness. Moreover the study of the effect of financial crises on economic policies should be deepened. Shocks on wealth not only affect the economy directly, but also through individuals' perception and ideas, and this can have a strong impact on the economy. Finally, more aspects of altruism and volunteering need to be explored. Up to now we have only considered public expenditure as a whole, while it might be rewarding to analyse how each specific component influ-

ences the relative segment of volunteering. Moreover, more specific recommendations regarding the “Big Society” could be formulated by further research on the ways in which government expenditure interacts with the personal abilities of agents and influences volunteering capital. These are but a few aspects which based on this thesis seem to deserve further exploration in the future in order to further expand the research agenda on the role of non-economic variables in political economy.

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